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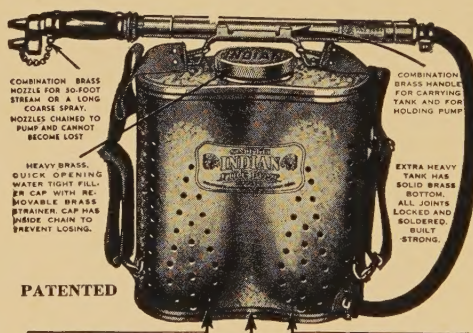


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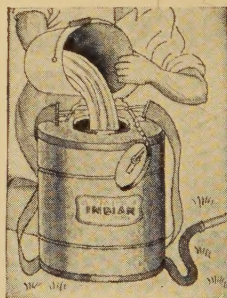
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EDITORIAL

A QUESTION OF JURISDICTION

THE proposal made by President Chapman to establish minimum instruction in forestry requirements for Junior membership in the Society met with divergent reception at the different forest schools. This may well have been anticipated because the proposal involves not only certain fundamental educational problems on the one hand, but fundamental professional problems on the other. Much of the apparent difference of opinion regarding the merits of the proposal is the result of not clearly distinguishing between its educational and professional implications.

No one will deny a university's right to determine the educational requirements for its degrees. This falls entirely within the jurisdiction of the university. At the same time, no one can deny the right of a professional group to determine the professional qualifications of its members. This falls entirely within the jurisdiction of the professional group.

A cursory consideration of President Chapman's proposal might easily lead to the conclusion that, if adopted, it would unduly emphasize utilitarianism in higher education and universities instinctively have more or less resisted such an emphasis on education, although the concept of what are the utilitarian and what are the liberal elements of education has changed greatly. Back in the early part

of the 18th century, that great proponent of utilitarian education, John Locke, called attention to the fact that "A set of lectures on political economy would be discouraged in Oxford, probably despised, probably not permitted." Even the teaching of science appears to have been somewhat below the dignity of the university, because, according to Locke, a classical scholar "would be scandalized in a university to be put on the same level with the discoverer of a neutral salt."

Today science and political economy are considered among the liberal elements of a professional curriculum. Who knows what may be called utilitarian tomorrow and what may be called liberal? Certainly in the technical and scientific age in which we live no man ignorant of the fundamental laws of the biological and physical sciences can be said to have a liberal education.

If the Society adopts specific educational requirements for Junior membership forest education will be subjected to certain dangers. Such action at the same time would open the way to certain educational opportunities. Whether the ultimate effect on forest education would be malignant or benign would depend quite largely on the educational statesmanship in our forest schools.

If on the one hand the forest schools would assume that the minimum educa-

tional requirements for Junior membership in the Society represented the only professional requirements for the baccalaureate degree, curricula would become standardized and inflexible, progress would be stifled, and forest education would deteriorate. However, if this should actually come to pass the responsibility for it would rest quite largely on the forest schools themselves.

If on the other hand the forest schools would regard the professional requirements of the Society as the irreducible minimum of professional instruction and build around this core, well balanced groups of cultural and professional courses designed to give the student not only the elements of a liberal education, but also additional professional instruction to prepare him for a career in a more or less well defined field, it undoubtedly would result in greatly strengthening forest education. It is barely possible that this more comprehensive educational program cannot be telescoped into a four year course. Five years may be necessary. This is an issue the forest schools must face squarely sooner or later. Here at least the trail is well blazed. Other professions already have followed it. Clearly the quality and quantity of medical, legal, and dental education was not harmed by increasing the course of study from four to five, six, or seven years.

It is also quite possible that it may not be found necessary to increase the length of the forestry course. Because medicine, law, and dentistry have done so is no infallible sign that forestry should do so. Great, but, to be sure, largely unexplored opportunities exist in improving instruction in professional fields. It is not unlikely that, if somewhat differently taught, professional courses might make a more significant contribution to the liberal education of a forester. If this can be done, and if certain other educational adjustments can be made it is quite probable

that a four-year course in forestry may be found adequate, at least for the time being. Nevertheless, if forestry is ever to achieve the professional standing and recognition we all desire, a firmer educational foundation will be necessary.

It is one thing for a group of workers to claim professional status; it is quite a different thing to assume all of the responsibilities and implications of the term. As Dr. Flexner points out so clearly, there are no unlearned professions. "Professions," he states, "are learned because they have their roots deep in cultural and idealistic soil. Moreover, professions derive their essential character from intelligence. Of course, the surgeon uses his hands; the physician uses a stethoscope; the lawyer uses a clerk and an accountant. But these are the accidents of activity. The essence of the two professions resides in the application of free, resourceful, unhampered intelligence to the comprehension of problems. . . Professions have primarily objective, intellectual, and altruistic purposes." Forest school faculties must be the first to acquire fully these professional attributes.

As important a proposal as this should receive neither blind approval nor blind condemnation. It should receive only serious, detached, deliberate study. The profession has within its grasp an instrumentality which rightly used will greatly raise professional standards, but which wrongly used may do unlimited harm. Other professions have used it with varying degrees of success. The future course of development of forest education as well as that of the Society is involved. The Society must not assume jurisdiction over the forest schools; the forest schools must not assume jurisdiction over the Society. The trail is hazardous, but with proper preparation and equipment it can be traveled with safety. Have we the courage and the knowledge to begin the journey and are we certain that we shall reach the goal in safety?

REORGANIZATION AND THE FOREST SERVICE

BY H. H. CHAPMAN

President, Society of American Foresters

For thirty-two years the Forest Service in the Department of Agriculture has been serving the Nation with fidelity and distinction. Great progress in forest conservation has been made. Now, when the goal is almost in sight, the proposal is made to transfer the Forest Service from the Department of Agriculture to the Department of Interior. This proposal involves fundamental considerations of policy, purpose, and ideals. The real issues are nonpartisan and nonpolitical. Some of the more important of these are discussed by President Chapman. This paper should be read not only by all foresters, but all others interested in the conservation of natural resources.

THE development of conservation as a public policy in the United States has covered a span equivalent only to the active life of the first generation of foresters who are now approaching the age of retirement. Its progress has been marked by successive periods of swift and sudden changes followed by consolidation and integration of the gains achieved. The first of these periods was that of incubation, and extended through the initial germination of federal and state forestry efforts, educational in character, under Fernow, Pinchot, and others, up to the birth of the U. S. Forest Service as an administrative agency in 1905, through the epoch making transfer of the National Forests from the Department of the Interior to the Department of Agriculture.

Now, after 32 years, we face a crisis, the significance of which should be clearly grasped not only by foresters but by the public at large; for it is the public's interests that are at stake. It is time for an honest and critical examination of the situation in all of its bearings.

The significance of the original transfer of the National Forests to Agriculture may have been lost sight of or obscured by the rush of recent events. At the time of its occurrence, practically the entire body of trained or professional foresters in this country was concentrated in the Department of Agriculture under the Bureau of Forestry. Agriculture as a federal agency was created in 1862 in order

to conserve the soil and its resources, through the application of technical research to land management. As applied to farm crops, animal husbandry, and agricultural economics, it rested on the sound and proved theory of private ownership and management, hence took the form of education through extension services, and publications, as the means of bringing about soil conservation. The tremendous weight of the farm population and interests naturally has been reflected in the relative amount of attention given to purely farm problems in the Department, and to the *relative* neglect of forest conservation by those responsible for the Department's principle emphasis and activities.

At an early date, the Department of Agriculture took the next step, that of inspection, as in meat products, foods, and drugs. Then came the great upheaval of economic problems, leading to the present wide extension of regulatory legislation, enforced chiefly through large subsidies paid to farmers for crop control, and accompanied by a program of soil conservation and rural rehabilitation which involved land acquisition on a large scale for purely economic purposes.

These recent developments in agricultural economy actually emphasized anew the close integration of forestry with all forms of soil conservation including floods, silting of reservoirs, and prevention of erosion problems which had caused the

adoption of the policy of *permanent reservation and management of forest lands*. This policy adopted in 1897 and incorporated as an agricultural policy in 1905, was followed in 1911 by the program of land purchases for the extension of public control of forests in the East. But the immediate effects (on the Department of Agriculture) of the program adopted since 1932, were to aggravate further, for the time being at least, the tendency to relegate forestry to the place of a stepchild, a forgotten Cinderella; indispensable as an accessory to the agricultural household, but, not important enough to be fought for as a legitimate member of the family. The shock troops must be concentrated on the more immediate problems of prices, exports, farm tenancy, and other major engagements along the economic front. Forestry to the average farmer means merely a woodlot, that can be left to grow of itself, until the owner wants something from it. This attitude has characterized the conservation situation to such an extent, and the agricultural interests in the several states have shown so little real interest in forestry and so low an appreciation of the great and expanding interests in conservation of urban populations, that this entire field of activity has been organized independently of state agricultural departments, except temporarily in two states, each of which regretted its mistake and rectified it later. The same spirit of neglect and misuse for the advantage of agriculture has been conspicuously present in the land grant colleges, which in the face of large enrollments in forestry, have too often cited their attendance as "agricultural" in order to get larger appropriations and new buildings for other agricultural purposes, leaving forestry on the hearth to sweep the ashes. Neither the Department of Agriculture nor the land grant colleges can be too severely blamed for this attitude, in the past. But if continued, its results will

be disastrous to both forestry and agriculture.

The farmer and his representatives in federal service and in Congress are no different from those whose backing is along other economic lines, in that their first consideration must necessarily be that of their primary economic interest, from which their main source of revenue is derived. The danger lies in failure to see beyond this immediate interest. Compared with labor, it is my opinion that agriculture and its representatives have a sounder and broader outlook, think more in terms of the general good and are more receptive of ideas that go a little beyond their selfish advantage.

What agriculture has overlooked in its treatment of forestry lies in two fields. First, it has not yet fully grasped the significance of a complete and effective program of soil conservation that includes forests, grazing, wildlife, and water control as an integrated whole, capable of effective coordination only in one department. In the second place, it has almost completely failed to evaluate the rise of urban interest in conservation, or measure the strength of this pressure for recognition in a nation-wide plan of conservation.

There are abundant signs of awakening recognition of the first of these requisites, but still with the emphasis largely on the farm woodlot—as was shown at the recent meeting of the Southern Agricultural Workers at Nashville, Tenn. this year. But as to the second, practically no progress has been made by the Department as a whole. Forestry, the stepchild, has been allowed to do what it could by its own initiative until the advent of 1937, of which more will be said later.

The awakening of urban interest in conservation presented a major problem in statesmanship, *which could have been solved had the Forest Service had a freer hand*. This statement is made on the basis of a complete mental summary of

developments for the past 30 years. The problem can be easily stated. Urban sentiment for conservation is, as a whole, not based on economics at all, but rather on emotional factors or sentiment. It is the result of the city dweller's contact with the forest; and his reactions to the conditions which he encounters. It can be expressed in its extreme but typical form as a desire to preserve natural conditions exactly as they are or were before man entered the scene. No trees should be cut for any purpose, and no use made of any resource or product of the soil whether it be minerals, forage, water, or wood. No game should ever be killed. Fish can be caught, because that is the only way they can be seen and enjoyed. But on the whole, the typical urban program of conservation is that of absolute prohibition of all utility whatever. The satisfaction of this recreational urge is the driving motive.

This would not be serious, were it not for the lack of reason and moderation, the total absence of the broad outlook, and consideration for the welfare of the Nation as a whole, which characterizes this body of propagandists for this particular conservation objective. Urban conservationists are, frankly, so much worse than the agricultural group that there is no comparison. I have never read anything equal to some of the statements made by the more emotional fringe of the urban group, for prejudice, narrowness, and outright selfishness, all in pursuit of an ideal which evokes all the enthusiasm of the early Christians. Such crusades take the form of constant pressure for the unwarranted and unneeded extension of park areas, on the basis that every tree and every acre thus consecrated is saved for humanity. Let me say here that this attitude is not typical of all urbanites or even of all groups; but when it comes to recreation we all go slightly crazy.

This is a far cry from the days when, under Gifford Pinchot, conservation meant

wise use and renewal of organic resources and a well balanced land-planning program in which all legitimate uses, both economic and recreational, were met by carefully planned adjustments based on research by experts and an accumulated wisdom obtained from practical experience, so that the greatest good was secured for the largest number of persons in the long run. The immoderate and inconsiderate position taken by the extremists of the urban group led naturally, as it does with all pressure groups, to the charge that all who did not whole heartedly espouse the cause of conservation by nonuse were enemies of parks and recreation, to be fought and brought under control or abolished if possible. The literature of the group is replete with attacks on foresters and on the Forest Service because under its administration trees are cut, and forests "destroyed", and the wilderness desecrated by commercial developments. Meanwhile in the parks thus wrested from destruction, formidable roads are built, gashing the mountain sides, in order to provide access to the public, to the great annoyance of the ultra-conservative group which would keep the public out entirely, except for hardy souls who could gain access on foot or horseback, to live the primitive life or get back to nature.

Let us at this point absolve the foresters of this wholly unjust and manufactured charge of opposition to parks as such. On the contrary they are the most sincere and intelligent advocates of exclusive use of *suitable* park areas, a fact which can be proven by the entire history of development of both National and State Parks. But the good of the whole Nation means more to foresters than the unlimited and unregulated extension of the single urban objective of recreational monopoly and nonuse to areas that are *not* needed or suitable for such monopoly, and that are vital to the economic survival of dependent populations. Furthermore,

not only can foresters visualize future forests on cut-over lands, but it is their first and most significant task to secure this renewal of the forests, and the principal thought and attention of the profession is increasingly focused on this problem.

The Forest Service therefore *cannot* take a position of complaisant acquiescence to any and all demands for park extensions without betraying its trust and responsibility to the Nation as a whole and to the various regions in particular which are affected by these proposals.

Now it happens, through historical sequence, that the National Parks, then without a properly organized service, remained in the Department of the Interior in 1905 when the transfer was made of the National Forests. When, later, with the rising tide of urban sentiment, the National Park Service was created, this organization found itself with a clear field, no inhibitions, and a body of sentiment to back it up on almost any program for park extensions which it chose to launch. Many of these were legitimate and necessary and further extensions are probably advisable. But this movement placed the Forest Service, and with it the entire program of conservation by wise use, in a vulnerable and defensive position, exposed to increasingly vindictive sniping or frontal attacks by a Department which had everything to gain and nothing to lose, and by supporters not interested in a balanced program of land-use management. There arose, and was fostered, from this situation the idea that these clashes over the extension of parks constituted merely a striving by two rival federal agencies for prestige—an inter-departmental fight—which should be settled somehow.

Into this picture, by a strange turn of fate, there is now injected, through an Executive coming from a state where the urban ideal of nonuse and exclusive recreational monopoly has been paramount for 40 years, the proposal to con-

cede to the Department whose most conspicuous claim to conservation is its service to urban desires, the monopoly of the idea and name of conservation, by the concentration in said Department of all the agencies administering public lands. It is openly acknowledged that this means the "restoration" of the Forest Service to the rechristened Department, and, if consistency is applied, the transfer of the wildlife refuges, and of publicly acquired lands for other conservation purposes. The precedent of the state of New York, on which this idea is based, and that of state organizations in general, is cited as a justification of such reorganization. Meanwhile—and this is what I alluded to previously—the Department of Agriculture, through official orders, has placed an ironclad prohibition on every person in its employ, neither to discuss nor mention the public principles or questions involved in this proposal, nor to endeavor in any way to influence others not thus officially controlled to take any action tending to enlighten the public as to the situation. As it affects the profession of forestry, this prohibition would undoubtedly act to muzzle any and all members of the Society including its officers, Editor, and Council, to the extent that such persons happened to be also employed by the Department of Agriculture. And this cannot be helped. But if circumstances were a little different as to these officers such a situation would come dangerously close to preventing a professional society composed of foresters in all lines of public and private employ, and representing all shades of economic opinion, from having anything whatever to say about the welfare of the country as affected by the policies proposed for conservation. The Society at present does not happen to be in this position, but the opportunity for expression is automatically confined to those of its members who are not on the payroll of the Department of Agriculture. Hence, what these independent foresters

think of the situation becomes of considerable moment.

The motives which might actuate the body of professional men who are still able to state their minds without incurring either the risk of dismissal or the accusation of lobbying in the interest of their jobs, have been outlined in the preceding discussion. Some, independent of employment, may feel strongly disposed to emphasize park and recreational development at the expense of multiple-use land planning. These are comparatively few. A greater number may sympathize with the idea that forestry will get more adequate recognition if divorced from a predominant agricultural interest which has sadly lagged in its recognition of forest conservation as a national rather than a woodlot proposition. Amongst this group we find many strong supporters of a change which will put conservation on the map, and some are even willing to run the risk of reorganization along the lines proposed by the President's committee in order to achieve their objective.

However, the official position taken by the Council of the Society of American Foresters, and by practically all other organized conservation groups to which this question has recently been put by the American Forestry Association, is that the Forest Service, Biological Survey, and other federal agencies dealing with organic resources should remain and be consolidated within the Department of Agriculture, and that the proposed dismemberment of these agencies be resisted as inimical to public welfare, destructive of efficiency, and wasteful of effort and financial resources.

The outstanding reasons for this decision are:

1. That under a dominant multiple-use policy of land planning and management, the legitimate needs for exclusive monopolistic use of areas for recreation can and will be satisfied by proper clas-

sification and segregation of such high-priority park areas without unnecessary sacrifice of the basic economic resources of the Nation, whereas, under a department dominated by the motives of single use and with all barriers to extension of parks swept away, and the redesignation of such areas left solely to executive decree, there exist no adequate safeguards to the inclusion of vast stretches of land in the White Mountains, Colorado, California, and elsewhere, in a greatly extended National Park system. Witness the recent sweeping transfer by executive order of all national monuments regardless of location, to the National Park Service and the consequent establishment of park nuclei, duplication of administration, and creation of "bureaucratic conflicts". This works in two ways: on the one hand, by national urban demand, in pursuit of the ideal of nonuse conservation which ruthlessly overrides local economic welfare; and on the other, by shortsighted local political pressure to create National Parks from areas of subnormal quality, in order to stimulate revenue from the tourist trade, caught by the bait of the National Park reputation; which is like cheapening the quality of an established brand of goods for the sake of immediate profit.

2. That under a coordinated program, the forest industries of the country, dependent now on private lands for over 90 per cent of their raw materials, have the best chance of survival through the integration of public and private efforts towards regeneration of forests, cooperative fire protection, sustained-yield units partly dependent on public timber, and the final establishment and recognition by the public that forests, in order to be used, need not be destroyed but can contribute in full measure to industry, agriculture, and recreation alike; while under a department divorced from the fundamental basis of multiple use, no such prospect exists.

3. That grazing and the use of the

forage crop on National Forests and the public domain cannot be effectively separated from the private agricultural, irrigation, and livestock interests of the West, or from the predominant public values involved in control of soil and erosion, and protection of reservoirs against silting, without threatening the entire economic structure of this vast region with swift destruction brought on to an alarming extent by abuse of the range.

4. That the plan for divorcing the grazing control from all immediate contact with other economic values in this region would, under present tendencies and attitudes in the Department of the Interior, give to the stockmen on the public domain a controlling interest dangerous not only to the public but to the perpetuation of their own industry. This is regarded by an increasingly large group of these stockmen as undesirable and headed for trouble.

5. That the basis of successful future game restoration and management lies in increasing recognition of the need for a balanced adjustment between environment, food supply, and game population, including predators and hunters, and through coordinating private with public game management, principles which are the basis of the entire conservation program in Agriculture; whereas in the Department of the Interior the extreme position taken by such crusaders as the Emergency Conservation League of New York City to the effect that no game whatever should be killed, finds full expression in the National Parks and their extensions, while on the public ranges, dominated by livestock interests, game may fail of proper recognition.

6. That the basic structure of an intelligent coordinated land policy dealing with organic or living resources must continue to rest on the closest possible coordination of administration of public properties with research into both physical and economic problems, on whose

solution alone depends the success of measures taken for the adjustment of conflicting interests and uses. There is no conceivable way by which this basic research can be split between two departments and remain effective. Just as the original coordination of the technical guidance with administration which was established in 1905 by the transfer of the National Forests to Agriculture was the primary contributing cause of the rapid and successful solution of the numerous and difficult problems of multiple use of public land, so the reversal of this process and the separation of public administration from its direct contact with these sources will promptly lead to a retrogression and lowering of the standards of efficiency. In this connection, and without intimating any reflection on those engaged in single-use administration, it will be accepted, I believe, by the profession at large that the combined problems of utilizing and at the same time restoring the forests; regulating grazing without damaging reproduction; providing for recreational use while not excluding economic development; adjusting game management to grazing, recreation and timber sales; fitting mining and water uses into the picture without disregarding other rights; and protecting the soil from destruction by erosion while at the same time allowing timber to be cut and stock to be grazed, requires a greater degree of technical ability and freedom from political influences than does any one single-use plan of management, whatever may be its nature.

Partly because of this fact, and partly through the traditional recognition of the incompatibility of skilled technical direction of such complicated problems with any political admixture which would tend to substitute favoritism for impartial justice and intelligent guidance, it has happened, and is universally recognized, that the Department of Agriculture has been comparatively free from political appoint-

ments, in which reputation the Forest Service shares. The same degree of immunity cannot be claimed by the department which now seeks the name of "conservation". Where a choice such as this is offered, foresters and the public should hesitate before seeking a reform by the "marriage" route.

7. The principle that public lands should be segregated in one department and private relationships in another is probably the most fallacious and untenable, although it is the basic, recommendation of the President's committee on reorganization as touching conservation. In a broader way the relations involved are the same as those outlined for research. The principle of public retention and management of forest lands found its justification, after the transfer in 1905, as the most effective means of expanding, strengthening, and coordinating the entire program of land conservation. It was a natural outgrowth of the purposes for which the Department of Agriculture was founded, and the proof of this is the recent swift development of a program of land acquisition to round out the expansion of economic control of agricultural resources. Should such recently acquired lands immediately pass out of the agricultural program by reason of their federal acquisition?

8. The coordination of public forests with private ownership and management of forest land is one of continuous adjustment, involving: land classification; the question of tax revenues; integration of sustained-yield units; cooperative fire protection; widespread extension of educational service; direct assistance to land owners through advice on practical operations (witness the C.C.C. and the Soil Conservation programs); demonstrations on public forests of the technique of silviculture and management; the influence of protection on lands without the forest; the adjustment of market problems, and supply and demand for timber products.

How will the solution of any of these problems be advanced by severing the control of public forests from all direct contact with any of the issues thus raised and putting them under the domination of a department whose whole outlook must be reformed before it can get away from the traditional policy of disposing of public land on the one hand, or of managing it exclusively in the interests of some one dominant group, on the other. The public knows what can be expected of the present setup in the Department of Agriculture, but there is not one forester in ten that would venture a guess as to the outcome, under such a plan as is proposed for reorganization.

In order to paint this picture with a proper perspective it has been necessary to emphasize certain basic mental attitudes which lie at the root of the whole controversy. Foresters by the nature of their training and outlook, and by the character of the problems which they have to solve, as long as they are in charge of forests managed for multiple use, are compelled by the very nature of these problems to set the general public good ahead of any single special interest. This is not necessarily true of foresters employed exclusively by and for a single interest, whether it be grazing, parks, game, or private lumbering, and it takes a real effort on their part to see things from the standpoint of the Nation rather than of the exclusive interest which they may represent.

The same thing is true of the various public elements which are aroused and struggling for a recognition of conservation. So we have a lack of coordination between agriculture, recreation, lumbering, game conservation, and grazing, as separate interests, on the one hand and sound land-use planning and conservation on the other, which is the real cause of this pulling and hauling. Foresters as a group occupy a position which will either make them the victims of a mad scram-

ble for group advantage regardless of the rights of others, or will enable them to fill the indispensable role of coordinators of these conflicting policies for the ultimate and lasting good of all and the firm establishment of true conservation of our organic life: the soil, the forests, waters and the game, and livestock. To this end, we must realize that while emotion and self-interest are powerful factors in swaying public sentiment and legislation, yet after all, the ultimate appeal must be to reason, justice, and co-operation, and on this basis we cannot afford to assume that the average citizen, whether on the farm or in the town, is impervious to common sense or incapable of seeing past his own nose.

When this question of reorganization first came up I was asked by two of the Council whether it was not time for the Society to reappraise carefully the basis

of its traditional position on the above policies, in order to see whether in the light of recent developments there was need of modification. The above discussion is the result of my personal consideration of the problem and it is hoped will be carefully reviewed by all members of the Society. Meanwhile, based on these considerations and upon the established policy of the Society, its position is that of positive support of the present organization of conservation activities in the Department of Agriculture and definite and emphatic opposition to the form of the proposed changes advocated by the reorganization committee's report.

This review deals solely with conservation and is not intended to reflect in any way on the many admirable recommendations on other topics contained in said report.



STATE PARK acreage has increased 18.38 per cent in the United States since 1933; 599,091 acres having been added to these areas, making a total of 3,859,087 acres. Prior to 1933 there were 792 State Parks, monuments, waysides, etc., in forty-two states, with a total area of 3,259,996 acres. Since 1933, thirty-seven states have reported acquisition of 350 Park areas. The number of Parks now totals 1,142. Since 1933, 636 C.C.C. companies have worked in 452 State Parks representing an acreage of 2,809,939.

OLD EVILS IN NEW CLOTHES¹

By GIFFORD PINCHOT

Every forester in America, despite his personal beliefs or political faith, will find the following paper by Governor Pinchot of intense interest.

IN THIS world of ours old evils are constantly turning up in new clothes. That exactly describes the proposal of Secretary Ickes to return control of the National Forests to the Interior Department (to be renamed the Conservation Department) from which they were taken some thirty years ago.

Before that time the Forest Reserves were horribly mishandled by the Interior Department. How horribly will appear when I tell you that at one time not a single man in Washington engaged in handling these vitally important forest lands had ever set foot on one of them.

On the other hand, what foresters there were in the government service were in the Department of Agriculture. The forest work of the United States was hamstrung because it was split up.

Research—the study of our forest resources and what to do with them—was entirely separated from their administration, with the result that both of them fell far below the public need.

Then, in 1905, research and administration—knowledge and its application—were brought together in the Forest Service of the Department of Agriculture. The result was the handling of the work in a way for which no one need ever apologize.

Why in the Department of Agriculture? Because the forest is a crop. That is the very essence of forestry. It is a crop grown from the soil. Forestry is a part of agriculture. It belongs by its very nature in that Department which deals with production from soil.

The Department of the Interior does not have charge of production from the soil. The Department of Agriculture does have. Then why should forestry be separated from the production of all other crops that grow from the soil? That question answers itself.

In spite of all that, now comes the proposal of Secretary Ickes to return to that same indefensible situation of thirty years ago dressed up in a new name. Under the smokescreen of establishing a Department of Conservation, Mr. Ickes proposes to split up and hamstring the forest work of the government all over again. He proposes once more to take the publicly owned National Forests out of the Department of Agriculture, where they have been admirably handled for a generation, and return them to the renamed Interior Department, whose treatment of them was a national scandal.

The Interior Department has regularly mishandled every public natural resource of which it has had charge, with the possible exception of the National Parks, the forest in which is not treated as a crop. And I do not except grazing on the public lands, of which it has recently taken control.

Here again is the old proposition of Secretary Fall, and it is no more worthy of respect now than it was when that distinguished enemy of the whole conservation policy was pushing it.

Under Secretary Ickes' plan, which proposes to return the forest work of the government to the bad old days of dual control, much of the old jealousy, divi-

¹Presented at the meeting of the Allegheny Section, Society of American Foresters, Harrisburg, Pa., February 26, 1937.

sion, and inefficiency would inevitably return. It would leave forestry on private lands in the Department of Agriculture, and put forestry on public lands in the Department of Interior—Conservation.

Thus forestry on one side of a fence would be handled by one Department, and on the other side of the same fence by another Department.

Right now there are more than thirty million acres of private lands inside the boundaries of National Forests.

So far as forestry is concerned, the Ickes' proposal would simply bring back the old confusion in a futile effort to remove confusion which does not exist. Confusion there is, and plenty of it, but not in forestry.

In a speech delivered in New York in February, the Secretary of the Interior spoke of "the administrative branch of the government as it now exists, with its overlappings, its inconsistencies, its in-

efficiencies, and its sheer wastefulness in time and effort, as well as in money". So far I agree with him completely.

Then, after claiming that the Department of the Interior "now administers the majority of our natural resources" (a statement which can only be described as ridiculous), he asserts that "there should also be an orderly and logical arrangement of conservation activities"—obviously under the new Department of Conservation which he advocates. Then in another part of the same speech he shows us what is in his mind—what, according to him, an "orderly and logical arrangement" should be. I quote:

"We must realize the close relationship between the problem of the farmer on the banks of the Ohio or the Mississippi Rivers whose land is periodically flooded, with the result that his rich top soil is rapidly being carried down into the Gulf of Mexico; the problem of the stockman



Left to right: G. Luther Schnur, Sec.-Treas., Allegheny Section; Hon. Gifford Pinchot; Arthur C. McIntyre, Chairman, Allegheny Section; President H. H. Chapman.

of the West whose diminished flocks are hard put to it year after year to support themselves on a wasted range that only a comparatively few years ago produced ample forage; the problem of the husbandman in the 'dust bowl' whose top soil is spared the fate of being washed away by raging floods only to be blown away by the mighty winds that prevail in that area; the problem of the lumberman whose transcontinental pursuit of our vanishing timber resources has already brought him stark against the shore line of the Pacific Ocean; the problem of the owner of rich soil that can support him and his family in generous comfort if only he can get water from irrigation dams for it; the problem of the farmer whose land is not exposed either to abnormal flood or abnormal drought conditions but who watches his water table vanishing under him; the problem of the outdoor man who finds the wilderness areas in which he loves to tramp and camp becoming more restricted year by year; and the problem of those who delight to go forth with rod or gun to track down the elusive game or to lure the wary trout with cunningly contrived bait."

Mr. Ickes, unquestionably without intending to do so, has given us a perfect picture of what he would like to do. The "one common problem" which he sees in conservation includes the problem of the farmer; the problem of the stockman; the problem of the husbandman in the dust bowl; the problem of the lumberman; the problem of the owner of rich soil; the problem of the farmer who watches his water table vanish under him; the problem of the outdoor man; the problem of those who delight to go forth with rod or gun.

I quote again: "The particular problems I have enumerated, and others like them, are only variations of one common problem."

Either Mr. Ickes doesn't mean that

"there should be an orderly and logical arrangement of conservation activities", and that "the particular problems that I have enumerated and others like them are only variations of one common problem"; or else we have here the picture of a gentleman so befuddled by the lust for power that he actually sees himself handling the problems of the farmer, the stockman, the dust bowl victim, the lumberman, the victim of erosion, the hunter, the fisherman, and the forester—all under his new and unnecessary Department of Conservation.

Undoubtedly Mr. Ickes would deny any such purpose. Undoubtedly he did not intend that any such meaning should poke its head out of his speech. But it is equally beyond question that his own statement shows how impossible is the attempt to confine the conservation activities of the government within a single department.

Conservation is the use of the earth and all that therein is for the permanent good of the human race. Thirty years ago its purpose was defined as the greatest good of the greatest number for the longest time. It is the greatest question of all, for upon its solution depends the future of civilization and the very continuance of human life.

Applied at first only to natural resources, it has come to include human resources as well. Conservation is as universal as the air we breathe, and in the long run just as necessary. No one Department, though it were as far flung as Mr. Ickes' dream, can ever include the whole of conservation. Then why transfer the Forest Service?

I defy Mr. Ickes or anybody else to mention a single specific benefit of any sort, kind, or description that could be obtained for the people of the United States, or for their work in forestry, by returning to the old split-up of that work between the Department of Agriculture and the Department of the Interior, that

would compare in any way with the benefits and advantages of leaving the Forest Service where it is now so well administered.

And incidentally, what Bureau in the Interior Department today is better and more intelligently handled, more generally clean, fine, and admirable than the Forest Service in the Department of Agriculture? Then why make a change?

Mr. Ickes' answer probably will be that the transfer is in the interest of "an orderly and logical arrangement of conservation activities". In that case, according to Mr. Ickes' own showing, an "orderly and logical arrangement of conservation activities" would equally require the transfer of the conservation activities that have to do with farmers, stockmen, lumbermen, and "others like them".

The fact is that the Interior Department is Uncle Sam's real estate agent. Without regard to how well or how badly it has performed that function, you do not let your real estate agent keep house

for you. And there is no reason why you should. Or why that part of national housekeeping which has to do with the National Forests should be taken from where it is so well done, and transferred and split up in order to put part of it back where it was so badly handled before.

I object to Mr. Ickes' proposal to bring back the evils of thirty years ago in a new suit of clothes. In spite of the fact that he has set his mind upon it, and to my personal knowledge has been working for it during much or most of his term as Secretary of the Interior, I am against it for the simple but sufficient reason that the public interest lies the other way.

This proposal is not sugar-coated for me by Mrs. Ickes' unconscious revelation that he would like to take possession of a large section of the rest of the government at the same time.

Too much power is bad for some people, and this case is no exception.



A NATIONAL conference was called by the National Lumber Manufacturers' Association and held at Washington, D. C. on April 7-9, in the rooms of the Chamber of Commerce of the United States. The official delegates of the Society of American Foresters who attended, by appointment of the President, were: Vice-President S. T. Dana, Council members F. W. Besley and Ward Shepard, and Ralph C. Staebner of the U. S. Treasury Department.

The purpose of the conference was to review industrial forest practice, public activity, and legislation pertaining to forest conservation, and to recommend such further industry and public action, including legislation, as may be necessary to give effect to a well considered joint program of private and public effort.—H. H. CHAPMAN.

THE DEVELOPMENT OF COOPERATIVE TIMBER MARKETING AND FORESTRY IN GREAT BRITAIN

By BARRINGTON MOORE

Many Americans no doubt will be surprised to learn that the market for home-grown timber products in Great Britain is poor, despite the fact that the country produces only a small fraction of its requirements. In order to develop better markets for home-grown timber, British forest owners have organized voluntary cooperative marketing associations. The success of these associations and the possibilities of similar associations under American conditions is described in detail. Extension foresters especially, who are wrestling with the problem of improving markets for farm woodlot products will be intensely interested in Mr. Moore's article.

THE British timberland owner is in very much the same position, with respect to markets, as the private owner in the United States where the large mills have cut out and moved on, leaving small scattered blocks of merchantable timber. With the departure of the mills has gone the principal market, and these small isolated areas of timber can generally be utilized only by small operators, usually manufacturing an inferior product. It is difficult to market this product, not only because of its relatively low quality, but also because the quantities supplied are irregular and undependable. It is therefore at a heavy disadvantage in competing with the well manufactured and regularly obtainable supplies coming through the Panama Canal to the Atlantic ports.

The situation of most forest owners in Great Britain parallels that of the American owner in cut-out regions because the forest areas are small, methods of manufacture are rather crude, and the quantities available are irregular and undependable. Severe competition is encountered with the well manufactured dependable supplies imported from Scandinavian countries, from Russia and from Canada, which correspond with the supplies coming to American Atlantic ports through the Panama Canal. The result, both in

parts of the United States and Great Britain, is a very difficult marketing situation which hinders the application of forestry practice in the woods.

BACKGROUND OF FORESTRY SITUATION IN GREAT BRITAIN

It is well known that forests were used for game long before they were used for producing timber. This attitude survives in Great Britain today perhaps more than in any other European country, partly because the love of sport is more universal and more deeply ingrained than in most other peoples, and partly because there has been little incentive to grow timber when it could be imported so easily. The World War gave a stern warning in the matter of timber importations, and resulted in the creation of the Forestry Commission, coupled with vigorous efforts to increase private planting. The Forestry Commission has carried out its share of the program, but the private owners have fallen far behind, in spite of lavish subsidies and generous tax concessions.¹ The reason is probably threefold: the splitting up of the large estates, the difficult market conditions, and the owner's attitude toward his woods as primarily useful for game cover.

Not only is the proportion of forest in

¹Forestry Commission. Fifteenth annual report of the Forestry Commissioners for the year ending September 30, 1934, London, H. M. Stationery Office, 1935.

relation to the total land area of Great Britain small, about 5 per cent, but the individual tracts, with few exceptions, are also small. A wood of 500 acres is considered very large; most are from about 5 to 100 acres. In the more fertile parts of the country the land is too valuable as farm land to use for timber growing, in some of the other parts a large portion is moorland which is considered unplantable. The small tracts are also partly attributable to use of the woods for game cover, because small, well placed woods are better for game cover and for shooting than large continuous bodies. Not infrequently the owner's choice of species and location for planting are governed by shooting considerations as much as, or more than, by the desire for saleable timber. This attitude is quite understandable in view of the poor market for the timber and excellent market for the shooting rights, which bring in an annual revenue of about 25 cents to \$1 per acre if the owner does not himself use the shooting.

As in the United States, the owners of small forest areas cannot afford the services of highly trained foresters to manage their woods or to find markets for the products. The larger estates employ men whose training has been in the woodsmen's school at the Forest of Dean or in short courses elsewhere, corresponding to ranger-trained grades in other countries. On the small estates the agent or the owner himself looks after the woods in connection with the rest of the property. Sometimes he has taken a short course in forestry, and sometimes he picks up what he can at the field meetings of the Royal English Forestry Society, which is made up mostly of woodland owners with a sprinkling of sawmill men.

Under these conditions it is impossible to expect either good silviculture or efficient marketing. There are, of course, exceptions, and one may find coniferous plantations as well made and as thrifty as any in Europe. But, by and large, one sees plantations made at heavy expense,² yet deteriorating through neglect and producing but a fraction of what they might yield, while owners are discouraged by the lack of a market and selling their timber to the local wood merchant for whatever he is willing to give, and to cut in any way he sees fit, which often means taking the cream and leaving the rest. It is not surprising, therefore, that the private owners have been unable to carry out the part of the forestry program allotted to them, in spite of all the government's efforts.

POOR LOCAL MARKET YET LARGE DEMAND FOR TIMBER

It is realized in Great Britain that the key to the forestry situation is in the poor market for home-grown timber, as contrasted with imported timber. Yet there is plenty of demand for forest products, as the country produces only a small fraction of its requirements, and Hiley contends that Great Britain affords the best timber market in the world, so that timber growing should be very profitable.³ As a matter of fact, those owners who have solved their marketing problem find that this is true, but they are the exception. Therefore the obvious line of attack in promoting forestry is to work out a solution of the marketing problem. The way this is being done is of interest to American foresters because of the similarity of the problem to that in parts of America, and because the same view-point

²Costs of planting in 1932 were about \$50 per acre. See Moore, Barrington. Impressions of forestry in England. Jour. For. 30: 951-957.

³Hiley, W. E. Improvement of woodlands. London, Country Life, Ltd., 1931.

prevails in both countries as to an owner's freedom of action in managing his own land, and as to the advantages of any group working out the solution of its own problems. Of considerable interest also to foresters in general is the important part played by the distinguished forest economist, W. E. Hiley, who is having the opportunity of putting into actual practice the economic ideas which he has set forth in his books.⁴

NEED OF ORGANIZATION IN SOLVING MARKETING PROBLEMS

The choice of a method to use in solving marketing problems depends both on the situation, and on the means at hand. For example, in some parts of the United States market information may be collected by a state-supported institution, such as the state university, or by the state forester, and distributed through the extension agents. In Great Britain there did not seem to be machinery of this kind that could be adapted to forestry. The most pressing need was for organization in some form to do what the individual alone cannot do: to collect information on market requirements and on available supplies so that the timber trade will know what it can count on, and so that the owners will know where and when to dispose of their products to the best advantage.

DEVELOPMENT OF THE HOME GROWN TIMBER MARKETING ASSOCIATION

The organization, known as the Home Grown Timber Marketing Association, was developed rather unevenly. Many of the branches got going before headquarters, with the result that each branch operates in a manner of its own. This

has had the advantage of affording a good deal of evidence about the relative advantages of different methods of organizing the work. During the process of development there was the fullest possible consideration of every aspect by all interests affected, the forest owners, estate agents, timber merchants, surveyors, engineers, foresters, Royal English Forestry Society, and others. For a good many months before any steps were taken the whole timber marketing situation was thoroughly discussed. Then a tentative plan was drawn up and submitted to local meetings in each region which were attended by representatives of all groups which could possibly be affected directly or indirectly. I attended two such meetings, and found them most instructive. There was an absence of the enthusiastic generalities which sometimes accompany meetings to launch movements, and instead there was thoughtful exposition of the problems involved, and proposed solutions. Particularly noticeable was the friendly spirit and willingness to cooperate between interests which might have been considered rivals, such as the forest owners and timber merchants, who are also sawmill men and manufacturers. It is true that during the earlier discussions of the proposed organization, there was a certain amount of suspicion that the forest owners were combining against the timber merchants. But that seems to have been overcome, and many of the timber merchants are now prepared to cooperate. The timber merchants are likely to gain from the organization by receiving information as to where and when supplies of timber are available for purchase. Thus they would be assured of more regular and dependable quantities of timber and so be in a better position to plan their operations. It is evident that a

⁴Hiley, W. E. *The economics of forestry*. London. Clarendon Press, 1930. See also loc. cit., footnote 3.

plan developed in this way, slowly, from the bottom up, and after mature thought and full expressions of opinion, stands a much better chance of successful operation than any paper plan worked out from above and handed down for application, however great the care and skill used in preparing it. Incidentally it is also an excellent example of purely voluntary cooperative effort in working out a very difficult problem and reconciling conflicting interests for the general good in the long run.

THE HOME GROWN TIMBER MARKETING ASSOCIATION

Objects.—The Home Grown Timber Marketing Association was set up in the latter part of 1935 with headquarters in London and branches covering the different parts of the country. It is a purely voluntary association, and each member retains full freedom of action. The objects of the association are rather broad, giving it power to do practically anything needed to help owners in marketing their forest products, including "the preparation, transport and marketing of such products in whatever manner may be found expedient." Of value to the timber merchants is the provision "to obtain and circulate information as to such products as are available for marketing." Important objects are the collection of information on existing markets, and the creation, encouragement and finding of new markets. Another object is "to establish uniform systems of grading and measurement." The association is also to act as arbitrator in disputes or differences arising out of contracts or dealings relating to woodland products, "and to provide a tribunal for the settlement of any such disputes and differences." In this it assumes a quasi-public function, as private organizations not infrequently do in England. For example the Automobile Association controls the motor traffic outside

of the large towns just as our police do. Another object is to promote the interests of owners and producers by legislative or other means.

Membership and Dues.—The membership of each branch consists of not only the members of the branch but also persons or companies not members of any branch on election by the Council. The annual dues are based on the area of forest owned by the member. The branch dues are at the rate of 4 cents per acre, with a maximum of \$50 and a minimum of \$5. The branches pay the main organization one cent per acre, with a maximum of \$7.50 and a minimum of \$2.50 for each member.

Officers and Administration.—The association is administered by an executive committee of the council. The council consists of the president, vice-president, and treasurer, representatives elected by each branch, representatives of associated bodies, and not more than 3 other persons chosen by the council. The executive committee has the power to appoint and dismiss the secretary and all other paid officers of the association, and to direct their activities, and also, under the direction of the council, controls the funds and property of the association.

Branches.—Subject to the general rules of the association the branches are free to adopt their own methods of formation and constitution. Local timber-marketing organizations which carry out the functions of branches of the association, but may be prevented by their constitution from becoming branches, may be affiliated with the association. Thus the association takes in pretty completely all organizations connected with the growing and marketing of forest products, and it works in conjunction with the Central Landowners Association, the National Farmers' Union, and similar bodies.

The association issues a bulletin about once a month giving information on markets, with prices and other items of

interest about growing and utilizing various forest products.

THE SOUTH WESTERN BRANCH OF THE HOME GROWN TIMBER MARKETING ASSOCIATION

Each branch of the Home Grown Timber Marketing Association operates somewhat differently from the others, but an idea of the work of the branches may be gained from a brief account of some of the activities of the South Western Branch, embracing the counties of Hampshire, Wiltshire, Somerset, Dorset, Devon, and Cornwall, a territory about 1,400 square miles larger than the state of Massachusetts. The rules of this branch are rather similar to those of the main association. The president of the branch is Lord Clinton, who is also president of the main association, and has been one of the leaders in furthering private forestry. The secretary of the branch is W. E. Hiley, so it is easy to understand why the branch has been one of the most active in the association.

One of the first steps taken by the South Western Branch, in addition to collecting information on markets and available supplies, was to form a panel of timber valuation experts for each county in the branch. These are all land agents, some of them resident land agents working for particular estates. Others are members of firms of land agents who take charge of many estates. When an owner writes to the secretary that he has such and such timber to sell, he is sent the names of several men who can value his timber, and information on prices, telling him whether the present prices for his particular product seem favorable or low. The owner then selects the man he prefers from the list of valuation experts, and gets him to make the valuation and to put through the sale on a commission basis in the usual way. The members of the valuation panel are not paid by the

association, getting only their commissions for the sales. They, however, do a good deal of work for the association besides making valuations. It is claimed that, in the short time the association has been operating, several of its members, through its help, have secured substantially increased prices which have covered their membership dues many times over.

COOPERATIVE COMPANIES IN TIMBER MARKETING AND FORESTRY

Two of the first-formed branches of the Home Grown Timber Marketing Association have gone beyond the expressed intentions of the association, though working in affiliation with it. A localized branch in South Devon, under Hiley's leadership, and a larger branch in northern England have formed themselves into limited liability companies so that they could make contracts and carry out sales for their members. Each member, however, retains complete freedom of action. The company in South Devon has been named the South Devon Woodland Owners' Association, Ltd., and was formed in February 1935. It covers an area of about 630 square miles (440,000 acres) between Plymouth and Exeter. Its members automatically become members of the Home Grown Timber Marketing Association and receive all the benefits of membership, including the bulletin. Its annual dues are the same as those of the latter association, and it is financed by these dues and by commissions on the sales made for members. The liability of any member, if the association is wound up, is limited to five dollars.

Sale Contracts for Members.—In making sales for members, the South Devon Woodland Owners' Association acts as a principal in its dealings with the purchaser, and as an agent in its dealings with a member. It is not liable to a member for failure to pay or breach of contract by a third party, but it holds a member re-

sponsible for any claim against the association on account of a breach of contract by the member.

Commissions on Sales.—The rates of commission on round, sawn, or standing timber for sales from any one member to any one purchaser are 10 per cent on the first \$250, 5 per cent on from \$250 to \$5,000, and $2\frac{1}{2}$ per cent on any amount above \$5000. This includes arranging for hauling if desired. If arrangements for felling or extraction to the loading point, or both, are made, there is an additional commission of one cent per cubic foot.

Advice on Forest Management and Silviculture.—The association makes an initial visit to the woods of each member without charge. Subsequent visits, during which silvicultural advice is given, can be arranged if desired. Actually the association now finds itself making a good many more than one visit to some owners, and giving a great deal more advice on management and silviculture than is covered by the membership dues. It has not yet faced the question of charging for this advice, as it wishes to develop the management aspects of its work, but intends eventually to make some arrangement with members to cover the cost of this activity.

A Successful Cooperative Company.—The success of this venture in cooperative marketing has fully justified anticipations, due very largely to Hiley's ability and efforts. The directors' report, drawn up like that of any other company, from February to the end of December 1935, shows that the association is solvent, with a very small excess of expenditure over income which is to be expected at the start. An indication of what it can do for the owners is found in the sale, within a short time, of \$5,000 worth of mine timber at an advance of 40 per cent on the prices received by the same owners when selling through dealers.

WORKING PLANS AND MANAGEMENT BY A COOPERATIVE FORESTRY COMPANY

The South Devon Woodland Owners' Association is rapidly developing from a cooperative company engaged primarily in marketing, which is, of course, the aspect which first appeals to owners, to one engaged also in forest management. The confidence of the members is such that sometimes the association is given carte blanche to handle the woods, including deciding what to cut, marking the trees, and even deciding what and where to plant. The association has made two detailed working plans for members for which moderate fees have been charged. On one, and possibly the other, the association will actually carry out the plan. The working plan staff has now been lent to prepare a plan for a larger area owned by a member of the South Western Branch. Thus it is evident that better silviculture follows closely on the heels of better markets.

THE NATIONAL HOME GROWN TIMBER COUNCIL

The Home Grown Timber Marketing Association should not be confused with the National Home Grown Timber Council which was formed at about the same time or a little later. The association is the operating organization; the council is for propaganda, for collecting statistics, and limited research in forest products, but carries out no commercial transactions. The council is composed of representatives of the Forestry Commission, the Forest Products Research Laboratory, forest owners, timber merchants, and the more important users of wood, such as mines, railways, the building industry, and architects. Two members of the association attend meetings of the council, and the two organizations work closely together. The importance which the government attaches to the council is shown

by the fact that the Forestry Commission is subsidizing the council for the first three years to the extent of \$37,500 on condition that a mere \$1,500 be contributed from other sources.⁵

AN EXAMPLE OF COOPERATIVE FORESTRY IN THE UNITED STATES

An account of the cooperative forestry developments in the United States is beyond the scope of this article. But an example may be mentioned to show the similarity and a few differences of the movement in the two countries. In December 1935, the Otsego Forest Products Cooperative Association of Cooperstown, N. Y., was incorporated.⁶ Its members, who own and control the association, are farm woodlot owners, and its objectives are the improvement of farm woodlots and better prices for their products. In its essential aspects, therefore, this association resembles the South Devon Woodland Owners' Association. The proposed method of operation is, however, somewhat different, in that the members of the New York association will not be left free to use the facilities of the association or not, and to manage their lands as they see fit. Plans call for members to agree to deal exclusively through the association and to handle their woodlots in accordance with the principles of good forestry. Furthermore, instead of making sales for individual owners on a commission basis whenever an owner wishes to sell, the plan is to handle groups of woodlots as units, cutting each lightly and frequently, and pooling the products for sale

or processing at a central plant near Cooperstown. These provisions would not be accepted by the English landowner, who strongly opposes any surrender of his liberty of action over his own land, but is quite willing to do a great deal voluntarily, as the success of the South Devon Woodland Owners' Association has clearly demonstrated. The English owner, since he lives on his land and has a sense of social responsibility, does not, of course, carry his liberty of action to the "cut out and get out" stage, though his strongly individualistic attitude, when transferred to a new country, can readily produce that result.

A further interesting comparison between methods of encouraging private forestry in the United States and in Great Britain is illustrated by the formation of the Division of Private Forestry in the U. S. Forest Service. One of the ways by which this division is to encourage the practice of sustained yield will be by assisting timber operations with management plans and information for the guidance of existing and new industries dependent on a permanent supply of forest products.⁷ In this respect the government in the United States is doing for forest owners and wood-using industries what the owners and industries in Great Britain are trying to do for themselves, with the assistance of government subsidies for planting.⁸ Of course the problem in the United States is much larger and more complex, and so there is more need for the government to give assistance and guidance in solving it.

⁵The 15th annual report of the Forestry Commission, (loc. cit. footnote 1), p. 46, gives more details of the National Home Grown Timber Council.

⁶News letter of New York State Forestry and Park Association, p. 10, Nov., 1936.

⁷Loc. cit. footnote 6, p. 15.

⁸It has been proposed that the money spent by the Forestry Commission in subsidizing private plantations be used instead to employ foresters to make a census of private woodlands and advise owners in forestry matters. See Rice, Col. S. M., Private woodlands and national defense. Quarterly Jour. Forestry, 31: 49-52, 1937.

SUMMARY

There is a similarity in the reasons for unfavorable local markets for forest products in Great Britain and parts of the United States where the large mills have cut out, leaving only small scattered blocks of timber. In both, the product from small operations is of inferior quality, as well as irregular and undependable in quantity. It is therefore severely handicapped in competing with imported supplies, in Great Britain from Scandinavia and elsewhere, and in the United States from the Pacific Coast through the Panama Canal.

In Great Britain the practice of forestry by private owners has been hampered, in spite of generous government subsidies, by the owners' attitude toward forests as game cover, by the splitting up of large estates, by poor markets, and by the small scattered ownership unable to employ foresters to develop markets and manage the woods.

The need for an organization to do what the individual alone could not do has led to the development of the Home Grown Timber Marketing Association for the purpose of assisting forest owners and timber merchants by the collection of information on markets and on available supplies, and in other ways. After the fullest possible consideration by all concerned conflicting interests were harmonized and a central association was set up, with branches covering the greater part of England.

The Home Grown Timber Marketing Association is purely voluntary, members retaining full liberty of action. Dues are based on acreage of woodland owned, with a maximum and a minimum amount.

The objectives of the association give it broad powers to carry out its purposes in any way found expedient, and include power to arbitrate disputes, and to set up a tribunal to settle disputes. Administration is concentrated in the hands of

an executive committee of the council, the latter comprising representatives of branches and affiliated bodies.

Each branch of the association is free to adopt its own methods of formation and constitution, subject to the general rules of the association.

The South Western Branch, under the presidency of Lord Clinton, also president of the main association, and the secretaryship of W. E. Hiley, is one of the most active. In addition to collecting information on markets and supplies, it has appointed panels of valuation experts for each county, who value the timber and make sales for the owner on a commission basis. Already several members have been enabled to secure substantially increased prices which have covered their membership dues many times over.

The cooperative movement has advanced to the stage of limited liability companies in northern and southwestern England. In the southwest, the South Devon Woodland Owners' Association, Ltd., affiliated with the Home Grown Timber Marketing Association, acts as the principal with the purchaser and as the agent for the member owners. It is financed by dues and commissions on sales. Increased prices have been obtained for members. This association engages not only in marketing, but in silviculture and forest management. The latter phases of its activities are increasing and may eventually predominate. Already it has made a forest-working plan for a member with a view to the association actually working the woods for which the plan was made, and it is preparing another. Improved silviculture follows closely upon improved marketing.

The National Home Grown Timber Council is distinct from the association already described, though both work closely together. The association is the operating organization, the council is for propaganda, collecting statistics and limited research in forest products. The Forestry Commission is paying most of the ex-

penses of the council for the first three years.

An example is cited of a cooperative forestry association recently formed by farm woodlot owners in New York state, with objectives similar to those of the South Devon Woodland Owners' Associa-

tion, but which is designed to allow less freedom to the individual owner. The government in the United States, facing a more complex problem, is planning to do for the forest owner what the owners in Great Britain are trying to do for themselves.



U. S. FOREST SERVICE PLANTED 215 MILLION TREES IN 1936

APPROXIMATELY 215,000,000 trees were planted by the U. S. Forest Service on National Forests in 26 states during 1936. Forest Service officials declared this to be the greatest yearly reforestation record. It topped the previous all-time high mark set in 1935 by more than 60 per cent.

Nearly 90 per cent of the total planting was done in National Forests in the Lake States and in the South. Region 9, which embraces Illinois, Indiana, Michigan, Minnesota, Missouri, Ohio, North Dakota, and Wisconsin, reforested 141,478 acres, which represented the planting of more than 140,000,000 trees. In Michigan some 78,000,000 trees were planted. Wisconsin was in second place with 40,000,000 set out in its National Forests. The major species planted in the Lakes States Region were Norway and jack pines.

In the South, where 55,000,000 trees were set out, Louisiana and Mississippi each reported the planting of 22,000,000 trees, mainly longleaf, slash, and loblolly pines.

COOPERATIVE TIMBER MARKETING¹

By F. T. MURPHEY
Pennsylvania State College

There is a widespread interest in cooperative timber marketing. In the following article Professor Murphey delineates some of the problems a timber-marketing cooperative must solve if it is to be successful. It is shown that there are no magical properties inherent in a timber cooperative that will relieve it from any of the marketing operations now existing. To succeed it must do the job of marketing more efficiently and more completely than it is done by the present marketing system.

IN this country of ours with its superabundance of natural resources of almost every sort and its ingenuous people the marketing of practically every commodity brings up an unending series of confusing problems. Free competition, clever substitution, efficient production methods, and an abundant supply of basic resources are largely responsible.

Marketing difficulties do not arise because of the fact that we as consumers do not buy and use large quantities of materials; the reverse is true. The trouble arises from the fact that there are more articles available for purchase than we need for a normal standard of living. We, therefore, want everything at a bargain price, which in most cases, amounts to a figure less than the average cost of producing and delivering it. In other words, we have in most instances a "buyers'" market. The producer, likewise, faces the same kind of market from the reverse side. If he is to continue in business he must maintain his costs of manufacturing and selling below this average cost figure.

In a "buyers'" market the consumer wants all sorts of services which he gets along without when the seller has the advantage. Due to this condition, the costs of marketing very often are far in excess of the cost of raw materials, labor and expense of producing the commodity. For the marketing of most commodities a

vast organization of middle-men has been built up to render the many services demanded by the consumer.

Timber is no exception to the rule. The buyer has the upper hand. He wants what he wants when he wants it and what is more, he is getting it. The present "set-up" of marketing agencies is supplying it according to his (the consumer's) desire.

At the present time in this region the original processing of timber is largely carried on by moderately to poorly financed individuals or small companies. With a small mill, a few teams, a tractor and truck, and a small crew of men this individual goes out, buys a small block of stumpage, processes it and then turns his product over either directly to a consumer or to a middleman, who may further refine it or dispose of it to retailer or consumer.

The simplest product the small lumberman sells is seldom ever consumed directly without further processing. The farmer, for instance, who buys from the lumberman a load of 2 x 4's for rough construction, often has to season his product, throw out the culls, and then cut the remaining material to fit his needs. The pulp mill must grade the load of pulpwood, season it, process it, and send it on through a long line of middlemen before it finally reaches your home for use as

¹Presented at the meeting of the Allegheny Section, Society of American Foresters, Harrisburg, Pa., February 26, 1937.

writing or wrapping papers. Even fuel wood manufactured by the local producer very often has to be "cussed" over by members of the household before it finally goes up the chimney in smoke.

The rule holding fairly uniform at the present time is that the less refined the timber product the lower the price received for it by the producer. As a result the margin of profit on such commodities is shaved to the bone; sometimes even some of the bone is removed. As it goes through more and more refinement, the value rises, costs increase and volume of output per unit of raw material decreases.

Today the average small producer of raw timber invariably manufactures only the roughest of materials and turns it over quickly to someone else for further manufacturing and tries therefrom to derive a profit. He goes very slowly into the production of higher grade (which always means more refined) products because of the loss in his volume output and the greater investments which are necessary for him to make in both operating costs and equipment.

WHAT IS A COOPERATIVE

The timber cooperative is usually an association of small producers who have joined themselves together for the purpose of gaining some of the advantages not found in the present system. It may be formed for the purposes of buying, selling, manufacturing, or a combination of these purposes.

The cooperative may be simply a voluntary association in which the members are free more or less to do as they think best. Then again the cooperative may be a tightly organized corporation in which the member has agreed for a specified time to give the organization full control of his resources.

It may be financed by membership dues, voting and nonvoting stock issued to members and others, and loans. The

individual member may have an interest in the organization which may or may not represent to him something substantial. In any case, if it is to be a workable cooperative there must always be a concession big or little made by the membership to the company.

Most foresters, no doubt, are primarily interested in a marketing cooperative organized for the purpose of profitably disposing of timber products cut from a group of small individually owned woodlots operated on a sustained yield basis.

A cooperative organized for marketing timber from small wooded tracts has many outstanding advantages over the present system. For instance, it can take and fill large contracts for certain timber items which are outside the possibilities of the small lumberman. With this ability to supply volume the cooperative may displace one or more middlemen or wholesalers.

It is possible for a cooperative to supply the entire demands of a city for fuelwood, a colliery with timber, a paper plant with wood, a sawmill with logs. In doing this it can secure for itself the profit of the now existing middleman. It can also get an increased price by giving the consumer a higher quality product, more prompt delivery, more liberal credit terms or other services not now performed by the existing wholesalers.

With the cooperation of its members a cooperative can provide a market for material now practically unsalable from the woodlands in its control. Of course, to obtain this advantage either the members themselves or the personnel of the cooperative must perform the added services of assembling, grading, or processing required to make these unsalable products sufficiently attractive to be sought after by the consumer.

There is strength in any group joined together for a common purpose whether this purpose happens to be buying, selling, or manufacturing. Our successful

corporations, which are really a tightly organized form of cooperative, show clearly by their results that much work can be accomplished in reducing costs and increasing the margin for return. Realizing that a cooperative has some real outstanding advantages over the individual method of doing business, let us take a little time in thinking over some of the problems and difficulties which might arise in the organization and operation of one formed for timber marketing.

OPERATING PROBLEMS

What timber products shall the cooperative handle: fuelwood, pulpwood, poles, mine timber, sawlogs, veneer logs, or a combination of these products? In this particular region the wide range of markets gives us considerable latitude for choice. No doubt a single type of timber product would be desirable at the start which would be available in large supply in the woodlands of the membership. Others could be added as time went on and as the managing personnel and membership became better informed on the specifications and requirements required in each additional product.

How can there be an accurate determination made on the available supply of the commodity or commodities being handled by the cooperative in each and all of the woodlands of members? Information must be at hand on the possible supply of all the sizes, grades, species usually wanted by a purchaser. For example, if the cooperative were selling mine timber, one of its customers might wish certain percentages of oak or special sizes of props in their buying order. Would the supply of these items be adequate to fill existing contracts?

Will the cooperative process, assemble, transport, grade, or perform any other service in connection with the marketing of the timber products being contracted? The members can be expected to carry

on all the operations or simply part of it. In the case of mine props the woodland owner could be made responsible for cutting and skidding out the timber, in most cases he could not take care of the transportation of them to the mine. I know many woodland owners who do not know enough about timbering to properly prepare such products for truck haul; others who do not have the time nor the desire to do the work. How will the cooperative handle these situations?

How far will the cooperative go in financing the operation? Office space, warehouses, manufacturing plants, trucks, and teams may have to be purchased or contracted for, labor will have to be paid for, and advances may have to be made to members for supplies and services rendered. The more of the process carried on by the cooperative for its members the greater will be the financing problem.

Will the cooperative get its capital largely by borrowing, or will it get it from its membership in cash or other service? Some cooperatives charge a membership fee, others sell voting and nonvoting stock to secure capital. Borrowing, of course, is difficult until visible assets are present.

In case it is the plan to have the members process, assemble, and transport the timber on order of the cooperative, how can the organization depend on supplying the needed materials of the proper grade on time? Unless the cooperative has some organization available to carry on this work, members are likely to be tardy in filling the request due to their other duties, weather, etc. Consumers, generally, follow as closely as possible a hand-to-mouth system of buying which entails deliveries on short notice.

What sort of a contract will the cooperative have with its members? How tight, how loose, and for what duration of time? Will this contract permit entrance and cutting by the cooperative in

the woodlands at any time during a specified period? Fulfillment of selling contracts may require such action from time to time.

How will the cooperative prevent chiseling by its membership? Frequently buyers appear on the scene and offer for certain classes of timber more than the cooperative is paying. How can the cooperative prevent these members from taking advantage of such favorable opportunities for profit?

Finally, how can a cooperative maintain sufficient volume of business so that the cost of its marketing operation will be below the level formerly existing. It is primarily through the lowering of marketing costs and the performance of additional needed services for the consumer

that a cooperative is able to yield dividends for its membership and net for them a higher return for their timber than they are now receiving.

These are just a few of the problems which will arise in the operation of any timber cooperative organized for marketing. All the problems must have workable solutions if a cooperative is to succeed. It should be realized fully by any group proposing such an organization that there are no magical properties inherent in a timber cooperative that will relieve it of any of the marketing operations now existing. Rather, the cooperative must do the present job of marketing more efficiently and more completely than the present organization if it would succeed.



INTERNATIONAL GRASSLAND CONGRESS

THE fourth International Grassland Congress is scheduled to be held at Aberystwith, Wales, Great Britain, July 15 to 18, 1937.

The third congress was held at Zurich, Switzerland, in 1934.

SIGNIFICANT FORESTRY TRENDS IN NEW YORK STATE¹

By JOSEPH S. ILLICK
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Conservation has made amazing progress in New York state. Beginning over fifty years ago, when forestry alone was given consideration, the concept of conservation has gradually broadened to include not only forests but lands, fish, game, inland waters, and recreational values. Dr. Illick has made a detailed study of this metamorphosis of the conservation idea in New York state. Everyone interested in state conservation activities will find this study of unusual interest. It also contributes to a better understanding of recent trends in national conservation activities.

FIFTY-TWO years ago—May 15, 1885—New York state established her first administrative setup for forestry. This was not the first setup for state forestry in the United States, for earlier that same year three other states—California, Colorado, and Ohio—enacted laws creating forestry units as a part of their state government. California established a State Board of Forestry, Colorado an Office of Forest Commissioner, and Ohio a State Forestry Bureau. In each of these three states the original forestry setup was of short duration, lasting only eight, six, and five years respectively. In New York state there has been an unbroken development of state forestry, in one form or another, since the original undertaking of 1885. While California has the distinction of being the first state to create and put in operation an administrative setup for forestry on March 3, 1885, New York has had the longest stretch of unbroken development of forestry of any of the states—now almost 52 years.

Far more significant than this long stretch of unbroken development is the fact that state forestry in New York got off to a good start. The Forestry Act of May 15, 1885, which authorized the appointment of a Forest Commission of three non-salaried members, is generally accepted as the first comprehensive forest administrative act in the United States.

It not only preceded all enduring administrative forestry acts of other states, but also those of the federal government. Not until June 4, 1897 did the federal government provide even the simplest kind of administration for the federal forest reserves.

That great changes have taken place in forestry in New York state during the past half century becomes obvious as soon as one undertakes even a casual survey of its development. Many of these changes resulted in improvements, others denote little more than a temporary forward spurt and still others record only struggle and even retreat. Throughout all this wide range of change and adjustment, it has been possible to distinguish a considerable number of significant trends. Figure 1 shows the major administrative steps since 1885 and throws some light on how forestry in New York has grown from a struggling unit of the state government to a major administrative division in a comprehensive Department of Conservation.

From its very beginning in New York state, forestry was closely interwoven with the park idea. In 1872 an act was passed by the state legislature setting up an Inquiry Commission of State Parks "to inquire into the expediency of providing, for vesting in the State, the title of the timbered region lying within the counties of Lewis, Essex, Clinton, Franklin, St.

¹Presented before the New York Section, Society of American Foresters, January 29, 1937.

Lawrence, Herkimer, and Hamilton and converting the same into a public park". Two of the seven members of this commission were Verplanck Colvin, a champion of the park concept, and Franklin B. Hough, who four years later became the first forestry agent of the federal government. That the park idea was a strong factor from the very beginning is attested by such names as "forest preserve", "Adirondack Park" established in 1892, and "Catskill Park" established in 1904. Sections 7 and 8 of the law of 1885 established the Forest Preserve in the well known language, which with few alterations, is now Article VII, Section 7 of the State Constitution. In it we read that all the lands now owned or which may hereafter be acquired by the state within specified counties shall be known as the Forest Preserve, and that "the lands now or hereafter constituting the Forest Preserve shall be forever kept as wild forest land. They shall not be sold, nor shall they be leased or taken by any person or corporation, public or private." That this preserve or park concept was a definite feature of state forest administration in New York from the very beginning is now an accepted fact, and today it remains as a positive check upon administration.

New York is not alone in having special provisions pertaining to forests and forestry in her constitution. At least eleven other states have one or more articles or sections in their constitutions pertaining to forestry. Among them are Massachusetts, Michigan, Wisconsin, Minnesota, North Dakota, Colorado, New Mexico, Utah, Washington, and Louisiana. This subject is of such special importance and timely interest that I have prepared a special report on "Forestry in State Constitutions", that will be published shortly. I will, therefore, not give further consideration to this subject now.

The second topic presented for your consideration is the fact that the conservation idea filtered into the administrative

forestry setup in New York state at least 15 years before the name "conservation" appeared anywhere as an official title of an administrative unit of any state government. As early as 1895 there was created in New York a Commission of Fisheries, Game, and Forests. Here was a grouping of three major state activities that later took on the name "conservation". Five years later (1900) the name was changed to Forest, Fish, and Game Commission. This name continued in use for eleven years, that is, until 1911 when it was changed to Conservation Commission. It was, therefore, in 1911 that the word "conservation" was first given an official administrative status in New York state.

Proof that the conservation idea was functioning in New York before the word "conservation" was first used as an administrative term in 1911 is provided by comparing the major activities of the Forest, Fish, and Game Commission during its last year of existence in 1910 and the major functions under the first Conservation Commission the following year. The official state report for 1910 lists a Department of Forestry, a Department of Fish Culture, a Department of Game Protection, and a Bureau of Marine Fisheries under the Forest, Fish, and Game Commission, and the following year (1911) three divisions: (1) Lands and Forests, (2) Fish and Game, and (3) Inland Waters were set up as administrative divisions of the Conservation Commission. Excepting a few minor differences the setups for these two years are almost identical, and it seems correct, therefore, to state that the conservation concept was in operation in New York state as early as 1895, when the first Commission of Fisheries, Game, and Forests was established.

New York was among the first but not the first state, to use the term "conservation" in her administrative setup. To be exact, she was the second state to give

conservation an official or statutory rating. Just one year earlier than New York, the state of Louisiana in 1910 established a Conservation Commission of 8 members. Five years after Louisiana set up the first conservation unit in a state government, Wisconsin (1915) created a "State Conservation Commission". Since then there has been a definite and sustained trend toward conservation units in state governments. My studies during the past three years, show that of the 42 states that now have forestry, in one form or another, among their administrative functions, 23 now handle their forestry work combined with one or more other major state functions. Of these 23 states, 17 use the word "conservation" as an official administrative designation. It is significant that 30 years ago not a single state had the name "conservation" among her official administrative designations, and now more than one-half of the states that give attention to forestry operate on a conservation basis, and a majority of these states use "conservation" as a part of the official title of their administrative setups.

That there has been and is now in operation a definite trend toward conservation throughout the United States is very obvious and extremely significant. Within the past three years Iowa, Kentucky, and Vermont have established departments or commissions of conservation and within the past few months Missouri has taken a similar setup by amending her state constitution. A number of other states are at the present time giving special consideration to a possible merging of their conservation activities. Even a casual survey of this strong and steady trend towards conservation setups in the different states shows that Louisiana and New York pioneered in the right direction when they organized their first conservation commissions more than twenty-five year ago.

It is also significant that several states have conservation departments or other special administrative setups for conservation that do not include forestry among

their conservation activities. Maryland has a Department of Forestry and entirely distinct from it is a Conservation Department administered by a paid commission of three members. The latter concerns itself chiefly with game, fish, sea food, and stream surveys. Florida also has a Conservation Department entirely distinct from its state Forest Service. Ohio has a Division of Conservation in her Department of Agriculture. It is administratively entirely distinct from the Department of Forestry connected with the Ohio Agricultural Experiment Station. It is quite probable, however, that in time the forestry activities in these states will be integrated more closely with other conservation activities.

The grouping of conservation activities under a single administrative unit of state government in most cases resulted in other administrative adjustments, for very few of the conservation setups were new undertakings. In most cases they are the result of shifting, grouping, regrouping, replacement, and even displacement of existing state functions. Throughout this coordinating process of conservation activities forestry has been moving definitely away from agriculture. Not less than ten states, at one time or another, have had their forestry work subordinate to or closely affiliated with agriculture. One by one they drifted away from their original administrative mooring. In 1934 only four states (Kentucky, Rhode Island, Tennessee, and Vermont) had their forestry work subordinate to agriculture. Now (1937) only one state (Tennessee) has forestry under agriculture, and during the past six months considerable thought has been given to revising the forestry setup in the only state in which forestry functions as a division of agriculture. In 1935 Rhode Island, in reorganizing her state government took a middle position by creating a Department of Agriculture and Conservation. In considering this administrative trend of forestry away from agriculture it is signifi-

cant that at least thirty states, that now carry on forestry work, never had it set up closely with agriculture. New York is one of these states in which forestry has always been administered independently of agriculture.

A review of the development of forest administration in New York state also shows that there has been a definite trend away from the *paid* commission type of administration, and towards an administrative unit headed by a single administrator. This trend in keeping with the economy and efficiency programs inaugurated in many states, rests upon sound principles of public administration, and agrees with the conclusions of the President's Committee on Administrative Management submitted under date of January 8, 1937. In the latter report we read that:

"For the purposes of management, boards and commissions have turned out to be failures. Their mechanism is inevitably slow, cumbersome, wasteful, and ineffective, and does not lend itself readily to cooperation with other agencies. Even strong men on boards find that their individual opinions are watered down in reaching board decisions. When freed from the work of management, boards are, however, extremely useful and necessary for consultation, discussion and advice; for representation of diverse views and citizen opinion; for quasi-judicial action; and as a repository of corporate powers. *** The conspicuously well-managed administrative units in the government are almost without exception headed by single administrators."

If one has any question about the waste and extravagance of paid commissions, one needs only to look up the New York conservation law of July 12, 1911, which provided for a commission of three members, each to receive \$10,000 annually. The commission also was provided with a Secretary at \$3,500, a Chief Engineer at \$7,000, a Counsel at \$7,000, and three deputies each at an annual sal-

ary of \$3,500. These positions were all statutory and totalled, exclusive of expenses, \$58,000 per year. The salaries alone of the three Conservation Commissioners and the three Deputy Commissioners totalled annually \$40,500. And all this exorbitant overhead was expended during the first year of the paid Conservation Commission, when conservation activities were just beginning to unfold and had not nearly reached the status they hold today. One does not wonder then at the decision of 1915, when the Commission was reduced to one salaried Commissioner at an annual salary of \$8,000, a Deputy Commissioner at \$6,000, and a Secretary at \$3,000.

The facts presented concerning these paid administrative commissions should not be confused with the unpaid advisory or semi-administrative commissions that are now serving forestry and conservation so effectively in most of the states in which they have been set up. These unpaid boards and commissions have been especially effective in checking politics, determining policies, securing appropriations, supporting legislation, and in the development and maintenance of public interest in forestry and other fields of conservation. A special study is now under way under my direction concerning these forestry and conservation boards and commissions. A report on this study will be forthcoming within a year, and, therefore, this subject will not be considered farther at this time, except to say that in recent years there has been a definite and strongly sustained trend towards these unpaid advisory or semi-administrative boards and commissions.

Another trend that deserves consideration is the extension of the base of conservation or the annexing of unusual activities to the usual conservation functions. As early as 1915 New Jersey created a Department of Conservation and Development. Since then, four other states (North Carolina, Vermont, Virginia, and Washington) have set up de-

partments or commissions of conservation and development. Several other states have also undertaken similar and other unusual conservation activities without modifying the title of their departments. Among the generally accepted major divisions of conservation are forests, fish, game, parks, lands, waters, and minerals. All of these are generally understood as branches of the broad field of conservation. But there are a considerable number of new, often unusual and even questionable lines of work which have been added to the generally accepted conservation activities. Among these are entomology, archeology, history, hydraulics, flotilla, oysters and water bottoms, education, research, statistics, public relations, publicity, state publicity, and one state is honest and bold enough to list propaganda as an official administrative division of conservation.

There is much more significance to the

annexing of the word "development" to conservation than the mere adding of a word, for the meaning of many words is changing continuously. It has been so with both the word "conservation" and the word "development". In the early days of conservation in this country the word "conservation" meant to withhold, to lock up, to reserve or to preserve. With this restricted concept there was perhaps a need for an additional word to cover the development or use of our natural resources. So the word development was added, but even before the word development was officially added by any state, the meaning of the word conservation was extended to include wise use and development. This extension of meaning made the addition of the word development unnecessary, and so in at least two states while the word "development" still remains in the official title of the state departments and commissions it is practi-

Fig. 1.—Development of conservation in New York

- (a) The Board of Land Commissioners consisted of the Governor, Lieutenant-Governor, Speaker of the Assembly, Secretary of State, Attorney-General, Treasurer, and the Auditor.
- (b) In 1880 a law authorized the appointment of eight game and fish protectors by the Governor. In 1888 the number was increased to fifteen and a position of Chief Game and Fish Protector was created.
- (c) Among the members of this commission were Horatio Seymour, Verplanck Colvin, and F. B. Hough. The latter became the first federal forestry agent in 1876. This commission submitted a report as of May 15, 1873.
- (d) Commission authorized by legislature. Members appointed by Comptroller. Prof. Charles S. Sargent of Harvard University headed this committee. It reported on January 23, 1885.
- (e) Law creating 5-member commission provided for the inclusion of 16 counties in the Forest Preserve.
- (f) All members salaried: President, \$5,000 per year; other members \$1,000. Commission authorized to employ a forester at \$2,000 and two assistants at \$1,200.
- (g) All members salaried. Chairman's annual salary \$3,000; the other four members \$2,500.
- (h) Made up of the Commissioners of Forest, Fish and Game and two commissioners of the Land Office.
- (i) Commission reduced to three salaried members in 1901 and to one salaried member in 1903 (salary \$5,000).
- (j) Created by New York and New Jersey to acquire and preserve the Palisades along the Hudson River.
- (k) Members appointed by the Governor for period of 6 years at an annual salary of \$10,000 each.
- (l) Commission functioned through three divisions; namely (1) Lands and Forests, (2) Inland Waters, and (3) Fish and Game.
- (m) Commissioner appointed by the Governor for a term of six years at an annual salary of \$8,000 and a Deputy Commissioner at \$6,000 and a Secretary at \$3,000.
- (n) Composed of Conservation Commissioner, Attorney General, and State Engineer.
- (o) In 1930 the Saratoga Springs Reservation was turned over to the Saratoga Springs Commission.
- (p) Fiscal matters are handled in a Division of Finance (not statutory) and legal matters are handled by a Conservation Bureau in the Attorney General's Department.

DEVELOPMENT OF CONSERVATION IN NEW YORK

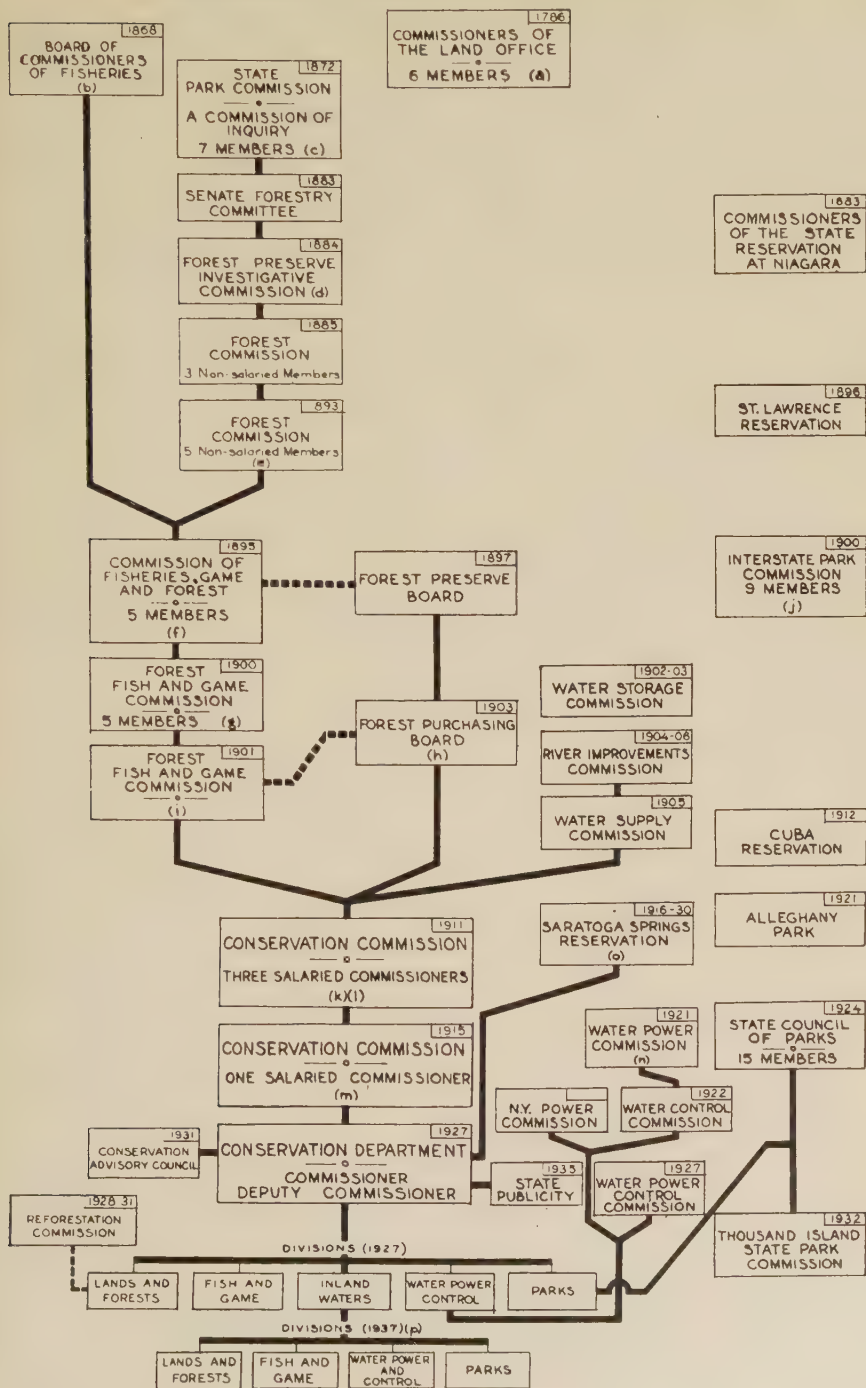


Fig. 1.—See explanation on opposite page.

tically obsolete. It no longer serves its original purposes, and could therefore be dropped without any confusion or loss. But on the other hand new uses and new interpretations of the word development have been unfolding. Among the activities that are now grouped under the administrative concept of development are the promotion of recreation, the stimulation of travel, the attraction of tourists, the selling of scenery and even the marketing of history.

On May 8, 1935 a law was passed in New York state creating a Bureau of State Publicity in the Conservation Department. An appropriation of \$100,000 was made to carry out the provisions of this act. The functions of this bureau, according to the law creating it, are that the Commissioner of Conservation, acting through the Bureau of State Publicity, shall:

1. Collect, compile, and distribute information and literature as to the facilities, advantages, and attractions of the state, the historic and scenic points and places of interest within the state, and the transportation and highway facilities of the state;

2. Plan and conduct a program of information and publicity designed to attract tourists, visitors, and other interested persons from outside the state to this state, and also encourage and coordinate the efforts of other public and private organizations or groups of citizens to publicize the facilities and attractions of the state for the same purposes;

3. Publicize the material and economic advantages of the state, which render it a desirable place for business and residence.

This Bureau of State Publicity as a part of the Conservation Department in New York state is not unusual. In 1929 Michigan appropriated \$100,000 to advertise the attractions and wonders of the state. In 1933 a Tourist and Research Commission was set up, of which the Director of Conservation was a member.

Wisconsin now has a Division of "Recreational Publicity" in its Conservation Department. Its present annual appropriation is \$40,000. Minnesota now has a Tourist Bureau, also with a special annual appropriation of \$40,000, attached to its Department of Conservation. It is an outgrowth of a Land and Lakes Attraction Board established in 1926 which succeeded The Ten Thousand Lakes Association, and The Greater Minnesota Association.

These recent developments within and adjacent to the field of conservation are presented so that we can take proper account of them. That they carry a strong appeal is most certainly true. That they deserve a place in the administrative set-ups of state governments is granted. That they have already brought a lot of grief to some conservation administrators is admitted. That they may distract and even subtract from old lines of conservation work very properly can be assumed. And through these developments there is a possibility of overloading conservation with supplementary responsibilities. And in this I see a real administrative handicap for conservation. It does not follow, however, that information and publicity pertaining to recreational opportunities, state attractions, and other special state developments do not have a place with conservation. The problem is to find the right place for it, and then integrate it effectively with other conservation activities. Experience has shown that satellite set-ups in public administration rarely function well in the long run.

I am fully aware that I have said nothing about the more specific forestry trends in New York state. I would have liked to consider such topics as trends in forest protection, trends of forest practices, trends in reforestation, trends in research, land acquisition trends, land management trends, timber management trends, fiscal trends, trends in personnel management, and many other important trends that

right now deserve our earnest attention and deliberate judgment.

In conclusion, I want to say that in my opinion there is a master principle at work throughout the whole field of conservation, and only in the manner and to the extent that we attune ourselves to

it can we give effective public service. I will present this principle by saying that it is our responsibility to develop conservation for an expanding future. The field of conservation, as I see it, lies not within parallel lines but is developing within expanding lines.



WILDLIFE SOCIETY ORGANIZED

THE Wildlife Society was organized at the Wildlife Conference held in Saint Louis, February 27—March 3. Its objective is the protection and restoration of American animal and plant species. Two classes of members are provided. Active members are those actually engaged in the practice or teaching of wildlife research, management, or administration, or those who are graduate students of those subjects. Associate members are those interested and sponsored by two active members. The Society's official organ, *The Journal of Wildlife Management*, will begin publication in July. Its editor will be W. L. McAtee, U. S. Biological Survey, Washington, D. C.

LOSS OF WEIGHT OF WOOD DUE TO WEATHERING

By GEORGE M. JEMISON

Northern Rocky Mountain Forest and Range Experiment Station

In the following article the author discusses the loss in weight of small wood cylinders due to weathering under different degrees of exposure. It is concluded that weathering, as distinguished from decay, may be practically disregarded as an effective agent in reducing the fuel volume in cut-over areas.

THE chemical and physical disintegration of wood by the atmospheric elements, a process commonly called "weathering", is apparent in all wooden structures, implements, and other wooden articles exposed to the weather, but quantitative measurements of this process are almost entirely lacking. The results of the process are of interest to foresters, to some wood-product manufacturers, and especially to users of wooden implements which are necessarily exposed to the weather.

At the Priest River, northern Idaho branch of the Northern Rocky Mountain Forest and Range Experiment Station, wood cylinders or dowels from $\frac{1}{2}$ inch to 2 inches in diameter, by 18 inches long, are exposed for the purpose of determining their moisture contents as indices of the inflammability of similar sized dead branchwood. These cylinders are lathe turned from clear ponderosa pine sapwood (*Pinus ponderosa* Laws.). Some of them have been exposed continuously on full sun, partial shade, and dense shade¹ sites since 1926. Others have been exposed at full sun and dense shade stations since 1929. All were oven dried before exposing them on wire brackets 10 inches above the ground, and have been redried and examined at irregular intervals in order to determine changes in their hygroscopicity due to age, effects of weathering, and presence of decay. After each redrying the cylin-

ders were returned to their brackets and left exposed continuously in exactly the same position as before.

Decay in these wood cylinders is believed to have been practically eliminated by the periodic subjection to oven-drying temperatures of 100° to 105° C. for periods of 48 hours. Periodic examinations revealed some blue-stain but never any decomposition typical of decay-producing organisms. It is well recognized that the climate of northern Idaho does not favor rapid decay. Also, as all cylinders were supported ten inches above the ground, conditions were still less conducive to the development of wood-destroying fungi.

As a result of these repeated determinations of oven-dry weight, a record is available which shows the losses in weight over periods of 7 to 10 years. Although this record is not as continuous or as regular as might be desired for this particular purpose, and although the results probably are affected somewhat by the oven-drying process, certain consistent trends of the data indicate at least two distinct and important features of the weathering process.

Table 1 shows the actual and curved data for 2-inch wood cylinders over a 10-year period under three degrees of exposure. Table 2 shows the effects of both size of cylinder and the degree of exposure for a period of $7\frac{1}{2}$ years. Curved data at regular yearly intervals is supplied in both of these tables.

¹The forest canopies on the partial and dense shade sites are penetrated by only 24 and 3.5 per cent of full sunlight, respectively, during the summer months.

The outstanding feature of both tables is the marked retardation of weathering losses as the cylinders are increasingly shaded from full sunlight and the high temperatures, greater temperature changes, maximum wind velocity, and greater impact of rainfall and sleet that accompany exposure in the open. Obviously,

storage under any kind of shelter very appreciably reduces the loss by weathering.

The outstanding feature of the data in Table 2 is the more rapid loss of weight of the cylinders one-half inch in diameter. These data indicate especially the need for protecting by painting or shelter all

TABLE 1

LOSS OF WEIGHT OF 2-INCH WOOD CYLINDERS DUE TO WEATHERING
Cumulative per cent of original oven-dry weight

Total years exposed	Date of measurement	Exposure					
		Full sunlight		Partial shade		Dense Shade	
		Actual	Curved	Actual	Curved	Actual	Curved
Cumulative loss, per cent							
0	April 1926	---	---	---	---	---	---
1	December 1926	1.4	1.4	---	---	---	---
2	October 1927	2.2	1.7	---	0.7	---	0.2
3	-----	2.2	2.1	---	---	---	---
4	-----	---	2.4	---	1.2	---	0.5
5	-----	---	3.1	---	1.6	---	0.7
6	January 1930	3.4	3.6	---	---	---	---
7	-----	---	3.7	---	2.0	---	0.9
8	-----	---	4.4	---	2.4	---	1.1
9	October 1931	4.8	4.7	2.5	2.6	1.1	1.2
10	-----	---	5.0	---	2.8	---	1.3
11	-----	---	5.7	---	3.3	---	1.5
12	October 1933	6.2	6.0	4.0	3.6	1.9	1.6
13	-----	---	6.3	---	3.7	---	1.7
14	-----	---	6.9	---	4.2	---	1.9
15	October 1935	7.3	7.3	4.1	4.4	2.0	2.1
16	-----	---	7.6	---	4.6	---	2.2
17	September 1936	7.8	7.9	4.8	4.8	2.4	2.3

TABLE 2

LOSS OF WEIGHT OF WOOD CYLINDERS DUE TO WEATHERING
Cumulative per cent of original oven-dry weight

			Exposure							
			Full sunlight				Dense shade			
Total years exposed	Date of measurement		½-inch size		2-inch size		½-inch size		2-inch size	
			Actual	Curved	Actual	Curved	Actual	Curved	Actual	Curved
Cumulative loss, per cent										
..	April	1929	---	---	---	---	---	---	---	---
1	-----		---	5.1	---	0.9	---	4.0	---	0.4
2	-----		---	8.0	---	1.8	---	6.2	---	0.8
	October	1931	9.1	9.1	2.2	2.4	6.9	6.9	0.9	1.0
3	-----		---	9.7	---	2.8	---	7.2	---	1.1
4	-----		---	11.2	---	3.7	---	7.7	---	1.4
	October	1933	11.9	12.0	4.4	4.2	7.7	7.9	2.1	1.6
5	-----		---	12.7	---	4.6	---	8.2	---	1.8
6	-----		---	14.3	---	5.6	---	8.7	---	2.2
	October	1935	15.4	15.1	6.4	6.1	9.3	8.9	2.1	2.4
7	-----		---	15.8	---	6.5	---	9.2	---	2.5
	September	1936	16.2	16.4	6.9	7.0	9.3	9.4	2.7	2.7

small sized wooden objects which, because they have a large ratio of surface area to total volume, lose the largest percentage of their total weight and lose it more rapidly than larger sized objects. Obviously, the smaller the size of the wooden materials used in the construction of implements or other pieces of apparatus the more essential it is to protect them from sun, wind, and rain.

To the forester responsible for fire control in the Northern Rocky Mountain region these data offer a partial basis for opinion and speculation. They show definitely the extremely slow rate of deterioration of small branchwood, $\frac{1}{2}$ inch to 2 inches in diameter, by weathering alone

during the first ten years. Extrapolation of these data indicates that such extremely long periods are required for even small sizes of fuel to deteriorate to a condition of little or no fire danger, that weathering may be practically disregarded as an effective agent in reducing fuel volume. Reproduction following an old burn shades the debris resulting from the fire and definitely retards the weathering process until even exposure for 100 years fails to result in any material reduction of original fuel volume on a weight basis. Breakage by snow and decomposition by fungi are the chief factors that cause deterioration of woody material on the ground.



FORTHCOMING MEETINGS

A JOINT annual meeting of the Pennsylvania Parks Association and the National Conference on State Parks will be held at Swarthmore, Pa., June 10, 11, 12, 1937.

The National Association of County Agricultural Agents will meet in Washington, D. C., during the week beginning June 7, 1937.

STORM DAMAGE ON THE CLOQUET FOREST

By T. SCHANTZ HANSEN

Division of Forestry, University of Minnesota

In August 1934 a severe wind storm occurred in northern Minnesota. The following March a sleet storm occurred in the same area. A study was made on the Cloquet Experimental Forest of the losses resulting from these two storms. Although the timber losses on a comparatively small area were not great, the total losses over the whole area affected by the storms were large.

WEATHER is one of the uncontrollable factors with which the forester has to deal. Silvicultural measures which control the form and composition of the forest are the only things that will minimize the effect of unusual weather conditions. The forester can do much to shape his forest so that it may withstand the ordinary weather conditions of any particular locality, but inevitably unusually severe storms occur and all protective measures fail. When these storms are of a catastrophic nature, the damage is usually easy to determine and figures on such losses are available. Often, however, storms occur which are severe but not catastrophic. The resulting damage is widespread but no entire stands are destroyed, and it is difficult, if not impossible, to determine the actual losses. During the past three years two such unusual storms have occurred on the Cloquet Forest. The record of damage done, although not complete, is presented herewith as illustrating the loss that may result from unusual weather conditions.

WIND STORM OF AUGUST 1934

On August 18, 1934, the temperature reached a maximum of 95° F. This was the third day of unusually high temperature. During the night of August 17, the minimum had dropped to 65° F. This is an exceptionally high minimum for this region and especially at that time of the year, as is indicated by the fact that the

first killing frost occurred two nights later. At five o'clock on the 18th a severe thunderstorm, accompanied by high winds, occurred. The high wind lasted only fifteen minutes. The records of the U. S. Weather Bureau located at Duluth, some twenty miles away, show that it attained a true velocity of 60 miles per hour. This is the highest wind velocity ever recorded at Duluth during the 66 years that records have been taken. The storm was classed as a thunderstorm, not as a tornado, since there was no twisting motion. Rain accompanied the high wind and continued to fall up to 7 o'clock, when a total of 0.56 of an inch was recorded.

An extensive survey of the forest the following day indicated that considerable windthrow had occurred. Upland-stands suffered very little as only two mature Norway pine trees were windthrown. Some breakage and windthrow occurred in the old jack pine stands, but this was very scattered and it was impossible to determine the volume.

The most severe damage occurred in the swamp types. Here the damage was great enough to permit the determination of the volume loss through the salvaging of the material where the damage was heaviest. In one swamp, 120 acres in area, which supported an all-aged stand of spruce and balsam, the damage was particularly heavy. The estimate of 1929 showed that this portion of the forest had a volume of 431 cords of spruce and 228 cords of balsam. The major portion of this volume was concentrated on 80

acres of the area. No cutting had been done in this stand, nor had the dead and down material been removed. The salvage of windthrown trees after the storm amounted to 125 cords of spruce and 61.7 cords of balsam. This is equivalent to 29 per cent of the spruce and 27 per cent of the balsam volume on that area. Other swamps in the forest did not suffer as severely, but there was some loss. The loss in the swamp in question constituted 9.5 per cent of the total spruce volume of the forest, and 15.3 per cent of the total balsam volume of the forest.

Very little windthrow occurred in a portion of this swamp in which improvement cuttings had been made during the previous winter. Two explanations suggest themselves. In the first place, the wind may have been quite variable and not as strong in all places; and secondly, many of the trees that were subject to windthrow may have been removed in the improvement cutting.

SLEET STORM OF MARCH 1935

In early March of 1935, a damaging sleet storm occurred. Rain began falling during the night of March 3, and continued until the night of the 5th. At no time during this period did the temperature rise above 32° F.; and during the night of the fifth the temperature dropped to 4° F. A total of 1.47 inches of rain fell which froze instantly on the trees. Small branches and twigs had a covering of ice fully an inch thick. During the night of March 6, a heavy northeast wind arose. This wind was not strong enough to have caused any damage under ordinary circumstances, but because of the load of ice carried by the trees considerable breakage resulted. In addition to the combined wind and ice damage, the weight of the ice alone was sufficient to cause breakage in many cases, and to bend trees so severely that it was impossible for them to straighten. Temperatures remained low until the fourteenth

of March, when it warmed up sufficiently to permit some melting of the ice coating.

Several types of damage occurred, some of which were most difficult to measure or estimate. The actual breakage could, of course, be determined through the computation of the volume cut. In addition, many trees were badly bent. In the first clean-up following the storm, most of these were left in the hope that many of them would straighten up. This hope was realized to a large extent. Those permanently bent are being removed this season. In numerous instances large branches were broken off, and the growing tips of larger trees broken. This type of damage reduced the crown area of the tree, and consequently its growth rate, and in cases where height growth was not completed, retarded it severely by necessitating the formation of a new leader. There is, also, the probability that the breakage may serve as an entrance point for various wood-rotting fungi. Where the stands were fairly dense and crown friction resulted, the ends of many branches and twigs were broken off, in many instances in such quantities as to completely cover the snow beneath the trees.

Two hundred and ninety-one cords of broken and badly bent jack pine were removed in the clean-up following the storm. This represents 2.9 per cent of the total volume of jack pine on the forest. 37 cords of spruce and 19 cords of balsam were removed from the stand which had suffered from windthrow in 1934. This represented approximately 10 per cent of the remaining volume of spruce, and 11 per cent of the remaining volume of balsam on that area.

A casual observation seemed to indicate that there was no relationship between the degree of thinning and other cultural work, and the amount of damage done. In many instances stands were severely damaged where no cultural work had been done.

A more detailed study of the relation-

ships between damage and cultural operations was possible on two experimental thinning plots, and a check plot in a stand of 37-year-old jack pine. Two degrees of thinning were represented in these plots, one heavy and one light, with the accompanying unthinned check.

In the heavily thinned plot which had 748 trees per acre, 32 trees or 4.2 per cent were damaged by the sleet storm. In the moderately thinned plot which had 1,069 trees per acre, 129 trees or 11.8 per cent were damaged. In the unthinned plot which had 1,980 trees per acre, 224 trees or 11.3 per cent were damaged. From the standpoint of number of trees, the heavily thinned plot showed the least loss.

In volume, the heavily thinned plot lost 33.24 cu. ft., or 2.1 per cent of the total volume. The moderately thinned plot lost 128.4 cu. ft., or 6.7 per cent of the total volume. The check plot lost 139.4 cu. ft., or 6.9 per cent of the total volume.

These results might seem to indicate that thinned stands suffered less damage than unthinned. In this one instance it

is true that such was the case, however, the extreme variation in damage throughout the forest indicates that this occurrence was merely a matter of chance.

It is of interest to note which size trees suffered the most in the storm. Table 1 gives the number of trees per acre in each diameter class on the jack pine plots, the number lost in the storm, and the percentage relationship.

The figures in Table 1 show no definite trend or relationship save that the smaller and consequently weaker trees suffered most.

While the data on these two storms prove little other than that considerable damage is done by severe storms, they do indicate that considering the region as a whole, the loss is large.

If we accept the figure of 3 per cent as a conservative indication of the volume loss of jack pine in the region, it would mean a loss of 18,060 cords of jack pine alone in the central and southern divisions of the Cloquet-Superior District.¹ Some of this material was probably salvaged, but the larger portion will no doubt be lost.

TABLE 1

LOSS IN NUMBER OF TREES PER ACRE BY DIAMETER CLASSES ON THREE JACK PINE SAMPLE PLOTS FROM 1935 SLEET STORM

Diameter class inches	Unthinned plot				Moderately thinned plot				Heavily thinned plot			
	No. trees per acre	No. lost	Percentage lost	Vol. lost	No. trees per acre	No. lost	Percentage lost	Vol. lost	No. trees per acre	No. lost	Percentage lost	Vol. lost
1	32	16	50.0	3.3								
2	556	100	17.9	39.2	72	27	37.5	12.2	28	8	28.5	3.8
3	808	96	11.8	78.8	322	55	17.3	47.4	105	8	7.6	6.9
4	452	12	2.4	18.1	347	42	12.1	58.2	275	16	5.8	22.6
5	128				222	5	2.3	10.6	210			
6	12				92				102			
7	4				12				24			
8					2				2			
9									2			
Total	1,984	224	11.3	139.4	1,069	129	11.8	128.4	748	32	4.2	33.3

¹Forest Survey Release No. 2. The forest situation in the Cloquet-Superior District, Minn. Lake States Forest Experiment Station, July 15, 1935.

THE PLACE OF FORESTS, THEIR MANAGEMENT AND USE IN SOCIAL, AGRICULTURAL, AND INDUSTRIAL ECONOMY OF THE SOUTH¹

By E. W. TINKER
U. S. Forest Service

The development of the pulp industry on a large scale in the South has created a new forestry problem—that of maintaining future timber supplies for the lumber and naval stores industry. If the proper forest practices are followed, the future of all three industries is assured. Mr. Tinker analyzes the problem as conceived by the Forest Service and points out how it may be solved.

FOR many years the forests of the South have formed a vital part of its agricultural and industrial economy. They have afforded a major opportunity for the employment of people. They have been a major producer of taxes and of freight. The lumber manufacturing industry found in the South an almost unparalleled opportunity. It has contributed not only to the prosperity of the South but to the agricultural and industrial upbuilding of the Middle West and of the East. It still forms an important part in our industrial structure. The continuity of the wood-using industries is so important to our future economy that a continuous supply of raw material should be of vital concern.

The South has been blessed with climatic and soil conditions that make the production of forests an attractive enterprise. The growth is rapid and the risks are comparatively small. Up to this time the business opportunities that exist through the use of land for tree crop production have been little appreciated and yet there can be no intelligent planned use in this region without consideration of forestry and the forest soils that form so large a percentage of the gross area.

Because of favorable conditions and tree species, second growth forests have

resulted from cutting methods that gave little or no consideration to forest regeneration. The second growth stands offer a source of raw material that, if properly managed, should form the basis for a continued agricultural, social, and industrial economy that will insure continued and increasing prosperity for the South. However, parallel with this opportunity lies the possibility of an unnecessary economic and social tragedy of vast proportions. Lack of consideration of the future and lack of planwise harvesting of the second growth forests will inevitably result in an appalling waste of land productivity, a migratory population, low standards of living, and temporary rather than permanent investments. It inevitably will further result in a breakdown of local political units through loss of tax base. The situation offers a challenge and a responsibility to the agricultural and forestry agencies, as well as to the statecraft of the South.

I would like to leave with you a brief word picture of this opportunity and its possibilities, as well as the inevitable consequences if the public agencies concerned fail to fulfill their responsibilities and if private initiative cannot be brought, by some means, to a recognition of its responsibility.

With the diminishing source of supply

¹Presented at the annual convention of Southern Agricultural Workers Association, Nashville, Tenn., February 3, 1937.

of old growth timber in the southern states, more and more consideration has been given to the potentialities of second growth stands that have been prolifically established. To a large extent, consideration has been given to the utilization of these stands without due regard to future productivity. It is known to everyone that an enormous new industry is being developed in the southern states to produce pulp from southern woods. I am informed that the total new capital investment in plants approaches sixty million dollars and further developments are contemplated. This investment will require commensurate returns and these returns will be based upon one of two plans: the corporate structures will either proceed to liquidate their investment on the basis of existing supplies of raw material; or, proceeding with carefully worked out plans, the plants will be operated with due consideration to continuous future forest production. In my judgment, it is distinctly contrary to the public interest that the former plan be followed. Not only is it contrary to the public interest but to the interest of the stockholders as well; and certainly it is not in the interest of labor, to whom security and permanence are possibly more vital than daily wage scales.

The pulp industry can and does use material of small size, and if its cutting practices do not provide for future forest production, and if not guided by well defined plans, with proper technical guidance, it is certain that irreparable damage will be done. The cutting of second growth stands down to a four-inch limit, with improper protection and with consequent later fires, will leave the land nonproductive for many years to come. The introduction of proper silvicultural practices and the formulation of proper management plans for areas tributary to these mills will result in an orderly and planwise utilization of second growth forests, without additional cost, but with a tremendous difference to the future wel-

fare of the South. The choice is clear and not subject to misinterpretation.

The timberlands of the South should be managed on the basis of their productivity and made to pay a reasonable return to the owners. Pulpwood or sawtimber should be harvested with a view to maximum production from the land that is being operated. I make a plea on behalf of the lumber industry that in the cutting of pulpwood the possible returns from the land in the form of naval stores and sawtimber be given adequate weight. Most foresters who have given consideration to silvicultural systems in southern forest types are in agreement that, with the prolific reproductive capacity of the southern forests, all the required pulpwood can be obtained from cultural operations, improvement cuttings, and in the form of thinnings. This procedure will assure not only the maintenance of pulp and paper plants but also the continued operation of the sawmill industry.

It should be called to the attention of farm woodland owners that it is possible to build up assets in the form of sawtimber or naval stores without materially reducing their current revenues from the sale of pulpwood if due consideration is given to the production of diversified products and the maintenance of maximum wood production.

Vital in this entire process is a campaign of education that will make every farmer and every timberland owner conscious that his forest is a renewable resource, and forest-wise to the extent that he appreciates the operation from the standpoint of a business enterprise. Upon the shoulders of men engaged in educational work among the land owners of the South rests a heavy responsibility—a responsibility that must be redeemed, and redeemed quickly, if practices markedly adverse to the public interests are not to be initiated. Left to an uncharted course and without proper educational effort, nothing less than disaster can result. I believe that the necessary basic research

has developed adequate material to work with, and if the planwise management of southern forest lands is not the result, then our educational efforts will have been a failure.

All thinking foresters, and I believe all thinking agricultural economists, interested in the future wellbeing of the people dealing with the land, should appreciate the full potentialities of the existing situation and the absolute necessity of a planwise approach.

In conclusion let me illustrate: some of the enormous pulp mills being established in the South will require as much as one-half million acres of productive, properly managed forest lands if they are to remain as a permanent industry rather than a temporary one, with the consequent tragedies of migratory employment and tremendous loss of public investments in the form of schools and other public improvements. These mills can obtain wood either from land in their own ownership or from that of other owners. They must be made to realize that it is not in the public interest to devastate their land to the point where it will be thrown back upon the public through tax delinquency and thus become

a public burden. If wood is obtained from other owners, these owners should be made to understand that their lands, if properly managed, can be made permanently profitable and productive of a continuous revenue. Unless the habitual thinking and processes of the harvesters of forests can be changed in connection with pulpwood operations, there exist all the possibilities of abandoned mills, dying towns, and the tragedy of unnecessary loss of opportunities for employment. If proper private management can be brought about voluntarily through educational processes, a certain solution is offered. If not, clearly the southern states for their own salvation, and with proper consideration of the rights of owners and operators, must resort to some form of regulation.

Vital in the entire picture is an intelligent campaign of education that will render every farmer and every timberland owner conscious of the problem and its solution. I have endeavored to give a word picture, as viewed by the Forest Service, of the forest land situation in the South. It is their problem and progress toward its solution should not be postponed or overlooked by their statesmen and their educators.

AN ANALYSIS OF THE REPORT ON THE WHITE MOUNTAIN NATIONAL FOREST AS AN EXAMPLE OF MULTIPLE-USE MANAGEMENT

By THOS. W. ALEXANDER

Consulting Forester, Asheville, N. C.

The author holds that expansion of the federal government's policy of National Forest acquisition is a wasteful subsidy which has resulted in unjustifiable investments; and uses the White Mountain National Forest as an example to develop his thesis. He proposes, instead, that federal funds be used to subsidize blanket protection of forest lands, regardless of ownership. In rebuttal, Philip W. Ayres defends the federal acquisition policy. He maintains that, providing all returns—financial, social, and physical appreciation of the property—are considered, the White Mountain National Forest has been self-supporting.

AS general manager of the White Mountain National Forest, R. M. Evans presented a report on the administration of this property by the U. S. Forest Service.¹ As a stockholder of the United States, I am interested in an analysis of his report (Table 1).

The federal government retains only 75 per cent of the gross receipts from National Forests. During the 22 years its return on this investment was 5½ per cent; and its average return in one year was 0.25 per cent.²

The states of New Hampshire and Maine received the other 25 per cent. Although not a resident of either of those states, I live in North Carolina, a state having comparable conditions, and I am therefore interested in the following figures.

Gross income to states in 22 years: \$158,588; per acre \$0.22.

Average income to states per year: \$7,208; per acre \$0.01.

As a stockholder in the United States, according to the above analysis my investment has given me a *gross* average income yield of 1/3 of one per cent per year. During the life of our enterprise

my corporation has paid interest on our investment at rates of 3 to 3¼ per cent (average government bonds over 22 years).

As a resident of the states involved I would have expected these lands to pay perhaps ten cents per acre per year into the state treasuries in the form of taxes. Since acquisition by the government they have yielded an average of only one cent. Considered on the basis of the financial returns only, it appears that we have made a very poor investment, and we must enter this item in our books in red ink.

TABLE 1
EXPENDITURES AND INCOME

	Costs	Average cost per acre
Land	\$5,440,000	\$7.67
Improvements	2,528,000 ¹	3.56
Administration	556,000	0.78
Total	8,524,000	12.01

	Gross Income	Per acre	Per cent of investment
In 22 years....	\$634,000	\$0.89	7.44
Per year	28,818	0.04	0.34

¹The report does not indicate whether or not this figure includes the total cost of C.C.C. improvements.

¹Evans, R. M. The White Mountain National Forest as an example of multiple-use management. Jour. For. 34: 1042-1045.

²These percentage figures do not give a true picture since the whole investment was not made at one time, but was spread gradually over the entire 22-year period. They therefore can be considered only as illustrative.

But the financial investment angle was not the main purpose of the Week's Law program. Primarily it was to provide for the protection of the headwaters of navigable streams, and the White Mountain National Forest occupies a "key position at or near the sources of four important New England streams." Some 15 per cent of the forest "lies above the zone of merchantable timber on the high slopes of the principal mountain ranges." This area of scrub growth and *barren* land might conceivably have been destroyed or denuded by some force had not our corporation purchased it. Although this appears to be a very far-fetched possibility, here is a credit item, not computable in financial terms, which we might recognize as existent.

The prevention of unwise land clearing by landowners might be considered a credit, were it not for the fact that in New England, as in the Southern Appalachians, the tendency is definitely away from further clearing of steep slopes and toward abandonment of areas which were cleared in the pioneer days of the regions. The major influence bringing about this tendency is simply economics, supplemented by the valuable educational work of agricultural and forest extension services. The influence of federal acquisition in this field can hardly therefore be considered an important credit item, especially since the percentage of the total New England mountain land area that is affected by the National Forest is so small.

The recreational business in the mountain region of New Hampshire accounts for a gross revenue of \$18,000,000, according to reports. The extent to which the National Forest serves as a safeguard to this industry in New England is not known to this stockholder. In the southern mountains the National Forests are not an important influence. The key resort areas of the Virginia and North Carolina mountains, in which recreation

is the primary industry, are White Sulphur, Roaring Gap, Blowing Rock, Little Switzerland, Chimney Rock, Cashier's Valley, and Highlands. Of these only Highlands is so situated that it might reasonably be said that the nearby National Forest possibly affects its popularity. Blowing Rock is near a small arm of the National Forest, but it was popular as a resort long before the forest was purchased. The others are not adjacent to National Forest lands. Other places such as Asheville, Brevard, and Hendersonville, have large interests in recreation. These are not only not primarily dependent upon the National Forests for recreation, but were popular before the forests were established.

This item may loom larger in the White Mountains. Very likely the trails, camp grounds, and skiing grounds that have been developed at government expense are used by large numbers of people. But according to the report, these recreational areas combined comprise but five or six per cent of the National Forest area. It can hardly be assumed that the basic scenic and topographic features of even these small areas (other than the trees) would have been destroyed under private ownership; but, even accepting such an absurd possibility, the net loss to the region would obviously be only a fractional part of its total recreational resources. It is doubtful, therefore, if this can be considered a major credit item, particularly when it is remembered that Maine and Vermont, nearby states without National Forests, seem to hold their resort popularity.

Fire protection is comparatively simple in the White Mountains. A gross state expenditure of perhaps five cents per acre should provide adequate blanket protection. Yet the state has given up a tax income of perhaps ten cents per acre on the lands within the National Forest. If this is approximately correct it would appear that acquisition by the federal gov-

ernment has not been financially beneficial to the states from the standpoint of fire protection. Protection would therefore be classed as a debit.

It is pointed out that the forest provides a stable timber supply for nearby industries. These adjacent industries require upwards of 300,000,000 feet annually, according to the report. The total cut from the National Forest to date has been 120,000,000 feet, or an average of 5,454,000 feet per year. The proportion of normal requirement that has been furnished by the National Forest to date is 1.8 per cent, not an impressive total.

A comparable condition applies to the timber cut as a stabilizer of local population. A portable mill cutting 5,454,000 feet annually would, in a normally efficient operation, employ 50 to 60 men in woods, mill, yard, and office. Finishing the material might require twice as many more, or a total of 150 to 180 men; an average of 35,000 to 40,000 feet per man-year. This checks closely with Mr. Evans' statement that nearby industries require 300,000,000 feet and employ 7,700 men. The National Forest has provided, according to this analysis, from 1.9 per cent to 2 per cent of employable woodsmen in the region with work.

It is explained that as these lands reach their full productive capacity they will become increasingly important in providing the required raw products. Undoubtedly this is so, but the question arises as to whether or not the same lands under different ownerships might not have reached the same ultimate importance. We know that private lands are now, both in New England and in other eastern mountains areas, yielding their second and even third crops of timber. It is rumored that New England is now very nearly on a self-supporting basis of wood production. Elsewhere, we are all being forced to revise our ideas of national timber supply as a result of the national "Timber Resource Survey" being cur-

rently conducted. If, as our managers assert, the stabilization of local industry and local population is an important part of the National Forest objective, I can only wonder what is their explanation or solution of the long period—already 22 years—that the local population has waited for that ultimate promised stabilizing effect of the National Forest timber. Had this been important the adjacent areas would long ago have been virtually depopulated.

These items, industry and population stabilization, have been so slightly affected by the National Forest to date as to be almost negligible items in the analysis, but might be classed as credits.

What else, then, can be said in justification of increased federal purchase? Our profession is called upon to endorse an acquisition program of some 220,000,000 acres, including 8,000,000 acres of southern mountain land. Surely the report on the White Mountain National Forest does not warrant such a widespread program. Yet, in casting about for legitimate reasons for such a program, the only additional credit item that occurs to me is that such a program will relieve some private owners of unwise investments. As agent for such owners I have earned material commissions through sales to the government. From this angle I am glad the Weeks Law exists, but this is a selfish viewpoint. Had there been no Weeks Law, some of the lands now in federal ownership would have become tax delinquent and have reverted to the states. But why would this have been such a catastrophe? At present the states are seeking state forests. Although any very large program of this sort seems to me equally as unwise as federal acquisition, yet, if it be warranted, I feel that it would be better for the public purse if the lands were acquired through tax delinquency rather than by purchase. To date no clear justification has appeared for the

administrative costs that seem inevitably to result from public ownership.

Evans advances one other beneficial result, as follows: "Single public management has, we believe, made possible the reconciliation of divergent interests and uses, and has avoided conflicts that multiple ownership and multiple management would likely have experienced." He does not give reasons for his belief, nor does he explain what the conflicts would have been. My own impression has been that just the opposite is probably true. Had the lands remained in the hands of several owners instead of one they would have had the benefit of the experience, desires, and management of several minds intent on making them productive of income; and some of those minds would likely have found uses for the lands that the Forest Service, concerned primarily with timber production, would never think of. This is a moot question which does not lend itself to proof either way, but the claim is not substantiated, and cannot be listed as a credit.

In the Southern Appalachians we have seen certain other items as a result of federal acquisition that may apply only locally, but that should be considered if the proposed expansion is to take place. We have witnessed the purchase by the government of mature timberlands running 30 per cent or more to chestnut. We have watched the loss of a large part of this chestnut by blight, when, had the timber remained in private hands, it probably would have been cut. We have watched and are still watching the running around in circles of timber stand improvement work, with no worthwhile policy yet worked out. We have seen the cycle in this field go all around the wheel and now come back, tentatively, to theories in effect 25 years ago, and still in

a highly unproved state. This would indicate that as concerns technical practice federal acquisition should still be confined to experimental areas, and that the present publicly owned acreage is sufficient.

As a stockholder in the United States at present and as the ancestor of future stockholders I am concerned about the proposed expansion of our acquisition program. Granted that the program is a subsidy for possible future emergencies, that does not mean that we can justify a wasteful subsidy. I am convinced that the acquisition policy is a wasteful and futile subsidy and that the funds could be used far more effectively in other conservation ways.

For example, the cost to date of the White Mountain National Forest has been \$8,524,000. At five cents per acre per year this amount would protect 7,749,100 acres for 22 years. Add to this acreage that which could have been protected by the average annual tax loss to the states, namely, 1,274,655 acres,³ or a total of 9,023,755 acres which could have been protected for 22 years.

One probable objection to this proposed "blanket protection" subsidy instead of the acquisition subsidy would be that under such an arrangement the federal government would have nothing to show in direct assets for its expenditure. My reply would be, first, that cost of administration plus interest on investment on acquired lands to date exceeds gross income, and indicates a worthless investment; and, second, that 9,023,745 acres would have been given the one sure, universally recognized forestry treatment instead of the 709,413 acres now receiving it, or more than 12½ times as much.

Blanket state-wide protection is not easy to achieve. Many difficulties must

³Arrived at as follows: Gross estimated annual tax yield to state from 709,413 acres (\$70,941.30), less average annual return to state from federal government under 25 per cent provision (\$7,208.55), or an annual net sum of \$63,732.76, applied at five cents per acre.

be overcome, such as politics and local inertia. But the remarkable progress that has been made in the past decade gives bright promise that this policy for using available subsidy funds is far more likely to yield results than is excessive

acquisition. Such being the case I would, as a United States stockholder, vote *against* the management's proposal to increase acquisition expenditures, but vote *for* a proposal to use available subsidy funds in blanket protection.

COMMENT ON MR. ALEXANDER'S ARTICLE

By PHILIP W. AYRES

Consulting Forester, Society for the Protection of New Hampshire Forests

MR. EVANS begins his article by stating that the Weeks Law was passed primarily for watershed protection with timber management as an adjunct objective. Mr. Alexander assumes that timber management is the major objective, and argues that because a better financial showing is not made upon lands largely savagely cut over before acquisition, this acquisition is wasteful and therefore undesirable.

To my mind, careful consideration of the factors disclosed in the White Mountain National Forest leads to a conclusion directly opposite to that which Mr. Alexander thinks he sees in it. From my standpoint a more unhappy example to prove the point he wishes to establish hardly could have been chosen.

Dr. Fernow used to remind his students that in financial forest management it is folly to expect early profits; trees grow slowly; and in Germany at least fifty years are allowed before an income is even expected on lands brought into public ownership. Mr. Alexander has seized upon an experiment not yet established, while the process of completing the original plan is still under way, with very large areas purchased only within the last year, thereby swelling the cost column only; and demands from it a showing of profit that should not be expected until at least a quarter of a century later.

You invest in a farm in January. You improve it during February and March.

April 1 you plant a crop. If you cast up your books on May 1 you are in the red. If you are a successful farmer and you cast them again at harvest time, you may have earned a reasonable rate of interest. The White Mountain National Forest has not reached harvest time. The marvel is that by wise management this Forest to date has shown any return at all. As a matter of fact during several years, including the cost of recreational improvements, it has been self-supporting, and thus early it has returned \$158,588 in lieu of taxes to the towns in which the purchases have been made.

The reply to Mr. Alexander may be divided into two statements: (1) *Financial*, and (2) *Other important considerations* that apply to mountain forests, particularly when they are used intensively for recreation.

THE FINANCIAL SITUATION

Mr. Alexander's statements are based upon three financial errors:

1. He has used as his basis of calculation of percentage returns the cumulative cost to the present time, instead of the average fixed investment during the 22 years the Forest was being built up. This figure is \$3,344,376 as a basis of consideration, not \$8,524,000 which he used. It makes a difference!

Mr. Alexander states in a footnote that his percentage figures "do not give a true

picture since the whole investment was not made at one time, but was spread gradually over the entire 22-year period. They therefore can be considered only as illustrative." Yet he makes very positive statements, based upon this confessedly not-a-true picture, that the purchases in the White Mountains represent "a wasteful and futile subsidy" and "a worthless investment."

2. Similarly, he has used as a basis for computing average returns per acre the total acreage of the Forest as it exists today, instead of the average acreage during the 22-year period. This average is 395,898 acres, not 709,413 acres.

The figures of cost and acreage in the White Mountain National Forest are available in the reports of the National Forest Reservation Commission from year to year.

3. In addition to the returns in cash from the sale of timber, Mr. Alexander makes no mention of appreciation in value of the property from annual growth. Every forester should recognize that any calculation of forest returns that omits the item of forest accretion leads to devastating miscalculation.

It is estimated that, due to accretion in the value of merchantable timber and

growth of young trees, the total appreciation on the White Mountain National Forest is \$1,607,000, or \$73,044 per annum. This, in relation to the average fixed investment is 2.2 per cent per annum, a figure for use below.

For comparison, let us restate the figures of Mr. Alexander's Table 1, using as a basis the average fixed investment (which omits administrative costs) and the average acreage, during 22 years, omitting, as he does, accretion values.

Thus we practically double the figures arrived at by Mr. Alexander. The average annual cash income to the government is \$0.0525 per acre, and the return on investment is not 0.25 per cent, but 0.65 per cent.

Adding to the average cash income per annum, which is \$28,819, or 0.86 per cent, the average annual accretion expressed in dollars, \$73,044, or 2.2 per cent we get a total of 3.06 per cent gross return on the total investment. Deducting the average cost of administration and maintenance, we find that the net income 2.3 per cent, which compares favorably with income from savings banks and government bonds. And the experiment is hardly begun!

OTHER CONSIDERATIONS

This review of Mr. Alexander's article does not attempt to deal with his main thesis, that purchases of forest land by the federal government may be undesirable throughout the South and elsewhere. It deals only with his attempt to prove his thesis by the unfinished experiment in the White Mountains. Based upon 35 years of observation as a forester in New Hampshire, I would set up this counter proposition, that in the mountainous portions of the poorer states, neither private ownership nor state purchase can suffice. In the northern mountains summers are short and cold; growth is exceedingly slow. An examination of many hundreds

TABLE 1
CASH INCOME, WHITE MOUNTAIN NATIONAL FOREST

	Per acre	Per cent of investment
Gross cash income in 22 years, \$634,000	\$1.60	18.96
Average income per annum, \$28,81907	.86
Less 25 per cent returned to state in lieu of taxes, \$158,500:—		
Gross cash income to federal government in 22 years, \$475,500	1.20	14.22
Average annual return	.05¼	.65
Gross return to states, 22 years, \$158,500....	.40	
Average to states per annum, \$7,2040182 (nearly 2 cents)	

of freshly cut stumps at 2,500 feet elevation in the White Mountains reveals that a spruce tree requires 100 years to become six inches in diameter, and nearly 200 years to attain 12 inches. The soil is composed of vegetable mould and is consumed by fire when dry. What fire leaves, erosion completes. New Hampshire's population totals 450,000 with no great wealth. There, as in neighboring northern New England states and in some of the southern states, the problem is financially beyond the states's resources. Moreover, in New England the great manufacturing interests that use water flowing from the White Mountains are located, with two exceptions, outside the boundaries of New Hampshire, as are all the large cities that use that water for domestic supply. The situation is an interstate problem. The Federal Union was established in 1789 specifically to deal with matters of this kind, which the states could not handle.

Space limitation forbids more than two or three further brief references to Mr. Alexander's paper. Speaking of the high White Mountain areas acquired, he remarks facetiously, "This area of scrub growth and *barren* land might conceivably have been destroyed or denuded by some force had not our corporation purchased it." Quite correct; though this is said to be a "far-fetched" credit item. Promptly whenever high slopes were acquired, the Forest Service drew the lines of protection forest much farther down the mountain sides, far below the areas then being logged by private owners. When the Weeks Law was enacted, six large companies had logging railroads extending into the high country. They and their contractors and subcontractors were skinning clean, up to the last pulpwood poles that would yield a few dollars and pay wages. They cut perfectly clean in order that the merchantable sticks might be rolled down to the skidways. Not one tree was left standing. The slash re-

maining, many times more than the timber removed, was a fire menace of the first order. And the fires raged, running up over vast stretches of scrub, rendering high places barren. The loosened soil is now filling up the dams along our rivers in Massachusetts and Connecticut. All logging railroads are now out of commission except one in Lincoln, where, during the last year, the government has acquired all the land, and the company will remove some of the remaining timber under regulation as to fire.

The ancient species of subarctic plant and animal life, trapped on our highest mountains when the ice-sheet retreated some 25,000 years ago, are of rare interest to teachers and students. It was a sober-minded, practical Supervisor of the White Mountain National Forest who after three years' experience first remarked that the mountain tops constitute a rare national museum of the post glacial period. They now can be properly cared for.

At the present time logging on the mountains in southern Vermont is carried on by private owners in a way quite similar in some respects to that formerly practiced in the White Mountains. These owners appear unready to assume unaided the burden of public welfare. Fire has not yet done its perfect work, but the slash awaits the careless hiker.

And how about Mt. Mitchell in North Carolina, the highest point between the Rockies and the Alps, the North Pole and the Andes? My first visit was in June 1889, when some of the finest spruce timber that ever grew in North America surrounded its summit almost to the very top. My last visit was after private ownership had done its worst. A logging railroad removed the timber, except on a very small area which the state could afford to buy, and a great conflagration did the rest. Is this destruction in private ownership one reason why Mt. Mitchell is not listed among the resort places of the southern mountains?

To quote again, "Maine and Vermont, nearby neighboring states without National Forests, seem to hold their resort popularity." Mr. Alexander will be interested to know that in recent years both states have passed enabling acts inviting the federal government to aid in their problems. Vermont's purchase area covers 500,000 acres of which 175,000 have been acquired. Maine has laid out a purchase area of 600,000 acres.

Mr. Alexander remarks, "It would be better for the public purse if the lands were acquired through tax-delinquency rather than by purchase." In northern New England I have not learned of any appreciable tax delinquency. There has been none in the White Mountains. Along the public highways for miles adjacent to the National Forest, private ownership has set up camp cabins of all descriptions, pumping stations, soda and popcorn stands, with many and ugly signs. Our visitors call this the scarecrow country. Private ownership would give us this condition throughout the mountains. Fortunately the Forest Service has saved us from our own cupidity. It has saved us also from large private preserves from which the public is excluded.

Protection from fire over ten times the area which Mr. Alexander says the pur-

chase money would have provided would not have removed the logging railroads that were destroying not only the timber, but also the underlying soil throughout our high slopes. The state could not have raised a tenth part of the cost. Had the six large companies united to oppose interference in their business, their influence in the state legislature must have proven a serious handicap.

The Forest Service has a very difficult task in the White Mountains to handle the swarms of visitors, 2,500,000 last season, stockholders like Mr. Alexander, and at the same time provide the raw material for a group of industries slowly but satisfactorily on the increase. This result is being splendidly accomplished. The reservation has been developed under the direction of a well trained scientific personnel, without a shadow of political influence. It is proving that *in one of the most intensively used recreational areas in the country industrial use and recreational use can advance together*. New Hampshire's slender financial resources never could have approached this result, nor, because of the interstate character of the problem, should it be called upon to undertake it. Private ownership has no incentive in this direction. Under multiple management it is impossible.

PLANT INDICATORS OF PURE WHITE PINE SITES IN SOUTHERN NEW HAMPSHIRE

By HELEN E. HAZARD

Research Fellow, Caroline A. Fox Research Forest

In Europe Cajander has used subsidiary vegetation as a site indicator with conspicuous success. In America comparatively little work has been done on this subject. Miss Hazard has made a detailed study of pure white pine forests in New Hampshire and has found that indicator types may be used to determine the natural fertility and silvicultural treatment of white pine areas.

IN THOSE long-settled portions of New England where once cleared land has reverted to forest, pure white pine stands form a temporary stage in the succession on a wide variety of soils. In the present study an attempt has been made to classify the forest floor vegetation of such stands with the view of discovering "indicator types", that is, groups of more or less uniform composition which may indicate certain humus and soil conditions. It was hoped that the ground vegetation in pure white pine stands might be differentiated into types that would indicate trends toward succeeding forest types, and climax forests. The results of such a classification would be of practical value to silviculture in enabling more intelligent management of the present sites by favoring the tree species best suited to the site and materially aiding succession toward the forest composition best adapted to the site in the long run.

In Europe herbaceous plant indicators have been worked out quite extensively by Cajander (3) but until recently only a little had been done in United States. Illvessalo (8) was the first to suggest several forest site types based on ground vegetation for the western United States and Canada. Heimbürger (6, 7) followed with a more comprehensive study in the Adirondacks and at Petawawa, Canada. Similar studies have been made during recent years at the Petawawa Experiment Station (2).

Because Heimbürger (6) has published an exceptionally complete summary of the literature on the origin and application of the modern forest type concept, with a bibliography of forest types and plant indicators it is unnecessary to review the subject here.

THE STUDY OF PLANT INDICATORS

During an extensive review of the literature dealing with white pine only two studies of plant indicators were found. Gevorkiantz and Zon (5), in a study of second growth white pine in Wisconsin, list the following plants as indicators of poor, medium, and good white pine sites.

Poor Sites.—Twin-flower, bracken fern, club moss, trailing arbutus, sweet fern, blueberry, princess pine, wintergreen, and bush honey-suckle.

Medium Sites.—Shield fern, lady fern, Solomon's seal, birthwort, hepaticas, sweet cicely, yellow wood sorrel, milkwort, greenbrier, and arrow-wood.

Good Sites.—Mandrake, jack-in-the-pulpit, baneberry, maiden-hair fern, downy yellow violet, alternate leaved dogwood, and prickly ash.

The Lakes States Forest Experiment Station (1) uses these same indicators.

Stanley (11) in a study of the indicator significance of the lesser vegetation in pure white pine on the Yale Forest near Keene, N. H., found the following indicator types:

1. *Cladonia - Andropogon scoparius* type; 2. *Vaccinium-Gaultheria* type; 3. *Maianthemum canadense* type; 4. *Cornus canadensis-Lycopodium complanatum* type; 5. *Aspidium noveboracense-Dicksonia punctilobula* subtype; and 6. *Pteris aquilina-Mitchella repens* subtype.

In a few other studies of white pine the authors either made lists of, or mentioned in passing, the plants growing on the forest floor in the particular white pine stands that were studied.

GEOLOGY AND CLIMATE OF THE REGION STUDIED

The topography of New Hampshire is very rugged with the White Mountains in the north and the Monadnock Plateau in the south. This plateau is broken by a double range of mountains which runs parallel to the Connecticut River and separates its valley from the Merrimack River valley, and is also broken by the Contoocook River which has dug a channel northeastward to the Merrimack River valley. The height of the plateau is from 500 to 1,500 feet above sea level. Above it rise isolated monadnocks about 3,000 feet high as Mount Monadnock in the south, and Mount Kearsarge and Mount Cardigan farther north. East of the Merrimack River valley the plateau changes to sand plains sloping from the Lake Winnepesaukee basin to the coast.

The part of New Hampshire covered by this survey extends from the Massachusetts line, north to the White Mountains, east to the coast, and west as far as Keene, Newport, and Mount Cardigan. This entire area is underlain by mica shists, granite gneisses, and granites of all kinds. Along the river valleys and on the sand plains to the east the soil consists of gravel and loam. Stony loams and fine sandy loams are found along stream courses, in terraces and on valley flats. Scattered throughout the area are small outcrops of clay. Till deposits, eskers,

morains, deltas, stream terraces, and lakes, caused by glaciation are found everywhere. Hilltop and hill slope farms are not as sterile as is often supposed. However, many farms have been abandoned, due in part to the great abundance of boulders and the sheet erosion which has gradually depleted the fertile top soil during nearly a century of cultivation.

The broken topography of New Hampshire causes a very diversified climate. The average temperature for the year in the southern part is 45° F., with an average of 23° F. for the winter and 66° F. for the summer. The rainfall for the year is about 40 inches and is evenly distributed, with 4 or 5 months of snow. In the mountains the rainfall averages about 15 inches more. Although the climate of New Hampshire is not exactly the same as that in the Lake states it is quite similar. As a result the forests and vegetation in the two regions are very much alike.

THE OCCURRENCE AND EXTENT OF THE WHITE PINE TYPE IN SOUTHERN NEW HAMPSHIRE

Geographically, pure white pine stands are found at the lower elevations in the more densely populated sections of southern New Hampshire. Most of the white pine is found in second-growth stands, the land having been cleared between 1735 and 1765. White pine in the original forest occurred singly or in groups among the hardwoods and hemlocks. As a permanent type it was found in pure stands only in the sand plains where it was associated with red pine; on burns and blowdowns it occurred as a temporary type (McKinnon, Hyde, and Cline 9). About 1830 farming had reached its greatest development and by 1850 from 65 per cent to 75 per cent of the land had been cleared. By this time due to the "gold rush", in California the de-

velopment of the West, and the Civil War, there was a rapid decline in agriculture in New England. Throughout southern New Hampshire, fields and pastures became seeded to white pine through natural seeding. The cultivated land formed ideal seed bed conditions and grazing freed the white pine from hardwood competition in the pastures. Where there was an abundant supply of seed the young stands were very dense. When these stands reached 60 to 75 years of age they became more open and a more or less dense understory developed. On the better soils and moist sites this understory consisted of hardwoods, but in the drier and poorer places, more xerophytic shrubs and conifers predominated. The first cuttings of this second growth took place about 1890. During the next thirty-five years a large quantity of pine was removed. On all but the poorer sites hardwoods came in and soon overtopped the young pine.

As far as could be determined all the stands included in the present study (except white pine plantations) were of second growth white pine which had come in naturally on old abandoned fields and pastures.

PROCEDURE

The ground vegetation in each stand was measured by the quadrat system. Meter square quadrats were used. The quadrats were taken every ten paces on strips across the stand twenty paces apart. An average of twenty quadrats per stand was taken. This number was more or less arbitrary and was increased or decreased according to the diversity of the individual stands. In each quadrat the number of individuals of each species¹ was counted and a general estimate of abundance and types of grouping made. The

frequency of each species in each stand was computed. Record were taken of the origin, age class, estimated density, average d.b.h. of each stand, and of the heights of the dominant trees. The composition, density, and heights of the understory were noted. An attempt was made to determine the site quality of each stand using height and age as suggested by Frothingham (4). However, weevil injury was frequently so severe that height and age as a site index was rendered valueless. The pH of soil samples was determined with the LaMotte soil testing set and the percentage of fine soil (less than 0.295 mm.) and coarse soil (0.295 mm. to 1.65 mm.) was determined by sifting and weighing.

EXTENT OF THE SURVEY

The survey included 120 separate stands in which a total of over 2,400 quadrats were taken. An attempt was made to recognize and classify indicator types in the field, and this was afterwards checked by the computed data from the tally sheets. In naming types an effort was made to keep the name as simple as possible, using, whenever possible, the name of the predominant genus alone or at most a binomial.

THE INDICATOR TYPES

The present study of the vegetation in pure white pine stands has led to the differentiation of five indicator types and five subtypes. They are arranged in progression from those representing xerophytic, and poor sites to those formed on mesophytic, and rich sites. This is essentially the same as a grouping of the indicator types in accordance with the ability of the sites concerned to reproduce white pine as determined by the

¹The nomenclature of the higher plants follows Gray's New Manual of Botany.

existing understory. These types are as follows:

A.—*Cladonia* type, first vegetation on denuded areas, may not reproduce white pine.

B.—*Vaccinium* type, will reproduce white pine.

C.—*Maianthemum-Vaccinium* type, intermediate, may or may not reproduce white pine.

D.—*Maianthemum* type.

E.—Rich Herbaceous type, too rich to reproduce white pine.

The Rich Herbaceous type may be subdivided into several groups as follows: the Fern, the Mitchellia, the Lycopodium, and the Aralia. These are based on the dominant ground cover present in the different situations and are described as subtypes of the Rich Herbaceous type rather than separate distinct types, because they show not only minor variations in the kind of soil, and in crown density, but also because they all indicate the same general trends in forest succession.

A.—CLADONIA TYPE (C.)

The *Cladonia* type was composed principally of dense masses of *Cladonia rangiferina* (L.) Web. with scattered clumps of *Andropogon* sp. and patches of *Polytrichum commune* L., *Cladonia cristatella* Tuck., *Myrica Gale* L. var. *subglabra* (Chev.) Fernald, scattered bushes of *Vaccinium pennsylvanicum* Lam., and *Spiraea alba* DuRoi. A few dry site mosses were sometimes present, covering small areas. This type occurred on all kinds of soils and rock surfaces. It is the first type of vegetation that comes in on barren areas. The *Cladonia* type was often found on open areas occupied only by a few scattered white pine trees. On such areas a stand of pure white pine comes up with an occasional paper birch, gray birch, red maple, or cherry in an

opening. *Cladonia* and *Polytrichum* may occur in small patches in white pine stands 30 to 40 years old with densities of 0.8 to 0.9. Except for these patches of lichens and mosses the ground may be almost bare except for a few clumps of *Vaccinium pennsylvanicum* Lam. which will change it to a *Vaccinium* type in a few years. On the better sites the succession may result in the *Maianthemum* or the Rich Herbaceous type. Where other seed is present the stands may become mixtures of white, red, and pitch pine, with a few hemlocks. The *Cladonia* type was only found in a very few instances and the data available do not permit a very definite description.

Other genera of mosses found on the *Cladonia* type were: *Hypnum*, *Dicranum*, and *Hylacomium*.

B.—VACCINIUM TYPE (V.)

Vaccinium pennsylvanicum Lam. was the chief constituent and was invariably present. *Polytrichum commune* occurred frequently. *Maianthemum canadense* Desf., *Rubus hispidus* L., *Pyrola elliptica* Nutt., *Polygala paucifolia* Willd., *Epigaea repens* L., *Pteris aquilina* L., *Lycopodium obscurum* L., *Carex* sp. (Ruppius) L., and *Gaultheria procumbens* L. Seedlings present are: *Pinus strobus* L., *Prunus serotina* Ehrh., *Prunus virginiana* L., *Acer rubrum* L., and *Quercus rubra* L. occurred infrequently.

This type occurred usually on very dry sand with a thin mortype humus and needle litter. The pH of the mineral soil ranged from 4.2 to 5.2, the average was 4.6 to 4.8. The density of the stands varied from 0.6 to 1.0. This type occurred in stands of all ages from 1 to 100 years. The stands studied were of pure white pine with no understory, with the exception of natural stands less than 20 years of age where gray birch, paper birch, cherry, and red maple were found.

C.—MAIANTHEMUM-VACCINIUM TYPE (M.-V.)

The *Maianthemum-Vaccinium* type was characterized by *Maianthemum canadense* Desf. and *Vaccinium pennsylvanicum* Lam. growing together in varying proportions. Other species found frequently were: *Pteris aquilina* L., *Gaultheria procumbens* L., *Cypripedium acaule* Ait., *Trientalis americana* (Pers.) Pursh, and *Pyrola elliptica* Nutt. Species found infrequently were: *Dicksonia punctilobula* (Michx.) Gray, *Mitchella repens* L., *Polytrichum commune*, *Rubus hispidus* L., *Epipactis tessellata* (Lodd.) Eaton, *Lycopodium complanatum* L. var. *flabelliforme* Fernald, *Epigaea repens* L., and *Oakesia sessilifolia* (L.) Wats. Seedlings present were: *Pinus strobus* L., *Acer rubrum* L., *Quercus rubra* L., *Prunus serotina* Ehrh., *Prunus virginiana* L., *Hamamelis virginiana* L., *Fraxinus americana* L., and *Acer saccharum* Marsh.

The *Maianthemum-Vaccinium* type was found on both sandy and loamy soils. The pH ranged from 4.0 to 5.2 and usually averaged 4.4 to 4.8. The only observed difference in the vegetation on the sand and on the loamy soils was that *Lycopodium complanatum* L. var. *flabelliforme* Fernald occurred on loam but not on sand. This type was found in pure pine between the ages of 15 to 125 years with densities of 0.6 to 1.0. There was either no understory or only a few hardwoods and hemlocks.

D.—MAIANTHEMUM TYPE (M.)

The ground vegetation was composed mainly of *Maianthemum canadense* Desf. well distributed throughout the stand. Other species that occurred frequently were: *Pteris aquilina* L., *Lycopodium complanatum* L. var. *flabelliforme* Fernald, and *Cypripedium acaule* Ait. Species that occurred infrequently were: *Pyrola elliptica* Nutt., *Polytrichum commune*,

Viola incognita Brainerd var. *Forbessii* Brainerd (Not in Gray), *Dicksonia punctilobula* (Michx.) Gray, *Gaultheria procumbens* L., *Epipactis tessellata* (Lodd.) Eaton, *Trientalis americana* (Pers.) Pursh, *Mitchella repens* L., *Oakesia sessilifolia* (L.) Wats., *Monotropa uniflora* L., *Carex* sp. (Rappius) L., *Clintonia borealis* (Ait.) Raf., and *Vaccinium pennsylvanicum* Lam. Seedlings present were: *Pinus strobus* L., *Picea rubra* Link., *Quercus rubra* L., *Acer saccharum* Marsh, and *Carpinus carolina* Watt.

This type was found on loam and sandy loam with a thin-mor type humus and needle litter similar to that of the *Vaccinium* type. The pH ranged from 4.2 to 5.0 and averaged of 4.8 to 5.0. The type occurred in stands of all ages from 15 to 125 years with densities from 0.5 to 1.0. These stands were mostly pure white pine with a small percentage of red pine, red oak, sugar maple, and gray birch. Usually there was no understory or where present it consisted of sugar maple, black cherry, red spruce, blue beech, gray birch, and hemlock seedlings.

1. *Maianthemum-Cornus* subtype. (M. c.).—The characteristic plants were *Maianthemum canadense* Desf., *Mitchella repens* L., *Trientalis americana* (Pers.) Pursh, and *Gaultheria procumbens* L. with an abundance of *Cornus canadensis* L. Other species that occurred frequently were *Dicksonia punctilobula* (Michx.) Gray, *Rubus hispidus* L., *Pteris aquilina* L., and *Pyrola elliptica* Nutt. The species infrequently found were: *Chimaphilla umbellata* (L.) Nutt., *Vaccinium pennsylvanicum* Lam., *Pyrola americana* Sweet, *Polytrichum commune* L., *Coptis trifolia* (L.) Salisb., *Aralia nudicaulis* L., *Lycopodium clavatum* L., and *Clintonia borealis* (Ait.) Raf. Seedlings commonly found were: *Quercus alba* L., *Quercus rubra* L., *Betula alba* L., var. *papyrifera* (Marsh) Spach., *Pinus strobus* L., and *Tsuga canadensis* (L.) Carr.

This was a richer and more moist site type than the *Maianthemum* and was found in sandy loam flats along rivers and lakes. The stands investigated had a density of 0.7 to 0.9 and a pH of about 4.2. There was usually a more or less dense understory of hardwoods such as sugar maple, red and white oak, beech and cherry. This type very closely resembled the *Cornus-Maianthemum* type found by Heimburger in the Adirondacks (6), and at Petawawa (2).

E.—THE RICH HERBACEOUS TYPE (R. H.)

The Rich Herbaceous type was a general type which may be subdivided into four subtypes, noted below. This type was composed of the same species as were found in the *Maianthemum* and *Maianthemum-Vaccinium* types. However, it differed from them in that neither *Maianthemum* nor *Vaccinium* was a predominant or characteristic plant. Another difference was that two distinct layers of ground cover were always found, the herbaceous layer, and the shrub layer composed of hardwood reproduction and occasionally of white pine and spruce. Both of these layers were more or less dense. The various subtypes were found on moist loam, and sandy loam. The pH ranged from 5.0 to 6.2 with the exception of the fern type where it averaged 4.6 to 5.0.

1. *Fern subtype* (R. H. f.).—In this type *Dicksonia punctilobula* (Michx.) Gray was the predominant plant. It occurred in stands with little or no other ground vegetation and in mixture with several of the following: *Maianthemum canadense* Desf., *Vaccinium pennsylvanicum* Lam., *Cypripedium acaule* Ait., *Pyrola elliptica* Nutt., *Epipactis tessellata* (Lodd.) Eaton, *Lycopodium complanatum* L. var. *flabelliforme* Fernald, *Pteris aquilina* L., *Polytrichum commune* L., and *Oakesia sessilifolia* (L.) Wats. Seedlings commonly found were: *Fraxinus americana*

L., *Prunus* sp. (Tourn.) L., and *Acer rubrum* L.

This subtype was found on loam and sandy loam. The pH ranged from 4.6 to 5.0 in stands 30 to 100 years old with a density of 0.7 to 0.8. In all but the young stands an understory of hardwoods or white pine was found.

2. *Mitchella subtype* (R. H. m.).—The ground vegetation consisted chiefly of *Mitchella repens* L. in mixture with *Maianthemum canadense* Desf. and scattered clumps of *Vaccinium pennsylvanicum* Lam. Other species present were: *Rubus hispidus* L., *Polytrichum commune* L., and *Chimaphilla umbellata* (L.) Nutt. Species found frequently were: *Coptis trifolia* (L.) Salisb., *Cypripedium acaule* Ait., *Gaultheria procumbens* L., and *Viola incognita* Brainerd var. *Forbesii* Brainerd (Not in Gray). Species found infrequently were: *Linnaea borealis* L. var. *americana* (Forbes) Rehder, *Clintonia borealis* (Ait.) Raf., *Pteris aquilina* L., *Epipactis tessellata* (Lodd.) Eaton, *Aralia nudicaulis* L., and *Dicksonia punctilobula* (Michx.) Gray. Shrubs and small reproduction found were: *Amelanchier canadense* (L.) Medic., *Lonicera canadense* Marsh., *Spiraea salicifolia* L., *Taxus canadensis* Marsh., *Viburnum acerifolium* Marsh., *Crataegus* sp. L., *Pinus strobus* L., *Fagus grandifolia* Ehrh., *Fraxinus americana* L., *Quercus rubra* L., and *Prunus* sp.

This subtype occurred on rich sandy loam with a pH of 5.0 to 6.2. It was found in both uneven-aged stands and in stands 80 to 125 years of age with a density of 0.7 to 0.8. There was usually a dense growth of hardwood reproduction found in both uneven-aged stands and in of red and sugar maple, red and white oak, beech, cherry, and sometimes spruce.

3. *Lycopodium subtype* (R. H. l.).—*Lycopodium complanatum* L. var. *flabelliforme* Fernald was the chief constituent of this subtype and was always present in dense masses. Other species present were: *Maianthemum canadense* Desf., *Rubus his-*

pidus L., *Trientalis americana* (Pers.) Pursh, *Pyrola elliptica* Nutt, *Vaccinium pennsylvanicum* Lam., *Cypripedium acaule* Ait., *Epipactis tessellata* (Lodd.) Eaton, *Lycopodium clavatum* L., and *Polytrichum commune* L. Species infrequently found were: *Pteris aquilina* L., *Lycopodium obscurum* L., *Polygala paucifolia* Willd., *Mitchella repens* L., and *Gaultheria procumbens* L. Seedlings and shrubs found were: *Quercus rubra* L., *Acer rubrum* L., *Pinus strobus* L., *Acer saccharum* Marsh, *Carpinus caroliniana* Walt., *Fraxinus americana* L., *Tsuga canadensis* (L.) Carr, *Amelanchier* sp. Medic., and *Quercus alba* DuRoi.

This subtype was usually found on fine loam or occasionally on gravelly loam. The pH averaged from 6.0 to 6.2. This subtype occurred in stands 40 to 50 years old, with densities from 0.7 to 0.9, and contained a good growth of hardwood reproduction consisting of red and white oak, cherry, red and sugar maple, paper birch, and ash.

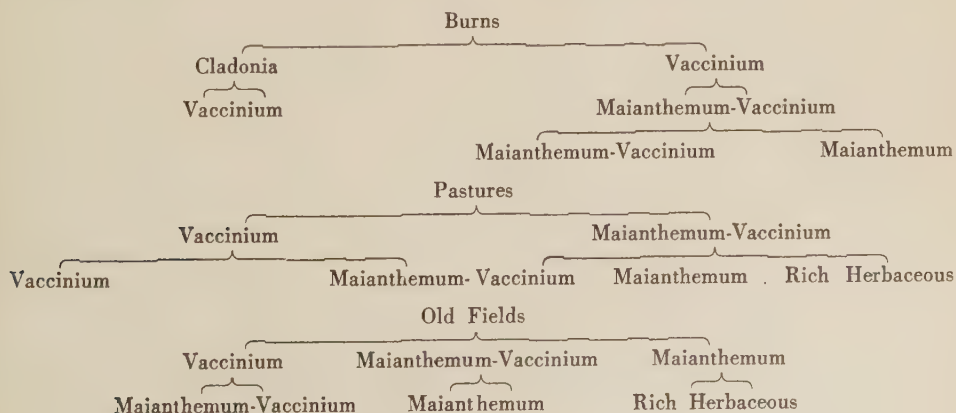
4. *Aralia* subtype (*R. H. a.*).—This subtype was characterized by a very dense ground cover consisting predominantly of *Aralia nudicaulis* L. Other species present were: *Mitchella repens* L., *Trientalis americana* (Pers.) Pursh, *Viburnum acerifolium* Marsh, *Maianthemum canadense* Desf., and *Gaultheria procumbens* L. The following species were usually present but

only in very small numbers: *Clintonia borealis* (Ait.) Raf., *Medeola virginiana* L., *Cornus canadensis* L., *Osmunda cinnamomea* L., *Oakesia sessilifolia* (L.) Wats., *Pyrola elliptica* Nutt, *Lycopodium complanatum* L. var. *flabelliforme* Fernald, *Aspidium noveboracensis* (L.) Sw., and *Aster accuminatus* Michx. Hardwood reproduction found was: *Quercus rubra* L., *Quercus alba* L., *Acer saccharum* Marsh, *Hamamelis virginiana* L., *Castanea dentata* (Marsh) Borkh., and *Carpinus caroliniana* Walt.

The *Aralia* subtype was found on sandy loam with a pH of about 6.0. It was a moisture-loving type and was found along flats bordering lakes and rivers. The stands contained a more or less dense understory of hardwoods, one to fifteen feet high. This subtype was similar to the *Aralia* type described by Heimbürger for Petawawa (2).

SUCCESION IN INDICATOR TYPES

In white pine stands that have come in on areas which have been made bare by some external disturbances such as fire, or heavy grazing, the ground vegetation will pass through several stages of succession during the life of the stand. These successions that take place may be represented as follows:



The succession will take place progressively from the *Caledonia* type to *Vaccinium*, to *Maianthemum-Vaccinium*, to *Maianthemum* and end with the Rich Herbaceous type. The degree to which the site has been disturbed determines the point at which the succession starts, for instance, severe burns start with the *Cladonia* type, heavily grazed pastures with the *Vaccinium* type, and slightly grazed pastures on loam with the *Maianthemum* type. The succession will continue until the climax type for that site is reached, such as, the *Vaccinium* type on poor xerophytic sites and the Rich Herbaceous type on heavy mesophytic sites.

Some evidence was obtained that shows that the indicator types occurring in the white pine stands of New York state and of the Lake state were very similar to those in New Hampshire.

TRENDS IN SUCCESSION IN PURE WHITE PINE STANDS IN SOUTHERN NEW HAMPSHIRE

The white pine stands of New Hampshire are mostly of second growth pine which seeded in naturally on old fields and pastures. A large percentage of the white pine stands are only temporary forming a definite stage in secondary succession. Reproduction of tree species and the invasion of characteristic plants indicate trends of succession.

The Cladonia type is the first vegetation on denuded areas and will be followed by white pine if there is a good seed supply near. If this type occurs on sand white pine will be followed by white pine. On loam white pine will be succeeded by hardwoods.

The Vaccinium type will reproduce white pine. Inferior hardwoods will come in if the white pine does not seed in densely.

The Maianthemum-Vaccinium type and *the Maianthemum type* are intermediate. They may or may not reproduce white

pine depending on the seed supply and the hardwood competition.

The Rich Herbaceous type is much too rich to reproduce white pine. On these sites even-aged mixed hardwoods of good quality will come in as shown by the dense understory of such hardwoods as, red oak, sugar maple, ash, and beech, and the invasion of such plants as *Aster acuminatus*, *Actea alba*, and *Streptopus roseus* which are abundant in hardwood stands.

PRACTICAL APPLICATIONS

Indicator types may be used to classify forest lands on the basis of potential natural productivity. Forest floor vegetation in general indicates soil fertility. The *Cladonia* and *Vaccinium* types in general indicate sandy soils whereas the *Maianthemum* and Rich Herbaceous types are found on moist rich loam. The *Cladonia* type is also found on dry loam following mismanagement.

Silviculturally most important are the differences found between the rich and poor types. The *Maianthemum* and Rich Herbaceous types are too rich to grow repeated crops of white pine because of the aggressiveness of the dense understory of mixed hardwoods. Here the white pine should be cut only after the hardwoods have become established as an understory, or inferior weed species, such as, red maple, gray birch, witch-hazel, and blue beech will seed in (9). In a few cases as in the *Mitchella* subtype, red spruce has become established as an understory. Where the *Vaccinium* and *Maianthemum-Vaccinium* types are found on sand they will probably be followed by white pine and inferior species of hardwoods. On loam the *Maianthemum-Vaccinium* type will be followed by better hardwoods.

On the areas where there are radical external disturbances the plant indicators pass through a series of successions. It

is not always possible to determine at an early age the best management for the future of the stand. However, by the time stands are nearly mature and ready to be cut the vegetation will have reached a stage which will indicate the succeeding forest.

As a general rule it may be said that where white pine is found on loam or sandy loam it will be followed by mixed hardwoods: therefore, the stands should be cut after hardwood reproduction has started. On sand, pine may or may not reproduce itself depending upon the seed supply before and at the time of the cutting operation. These stands should be cut after good seed years. The growth of the succeeding white pine should be aided by weeding out the inferior hardwood species.

Knowledge of succession in white pine stands can be used to good advantage in planning white pine blister rust eradication programs. "Indicator types" also facilitate classification of lands for many purposes.

SUMMARY

An attempt has been made to classify the vegetation growing under pure white pine stands in southern New Hampshire into indicator types.

The survey has shown that the following types (arranged in progression from xerophytic and poor sites to mesophytic and rich sites) can be recognized:

- Cladonia type
- Vaccinium type
- Maianthemum-Vaccinium type
- Maianthemum type
- Maianthemum-Cornus subtype
- Rich Herbaceous type
- Fern subtype
- Mitchella subtype
- Lycopodium subtype
- Aralia subtype

These types have been correlated rough-

ly with more or less distinct ranges in pH values of soil, crown density, and age class. The rich site types were found on the heavier, more moist, and less acid loams and sandy loams. The poorer site types (Vaccinium and Maianthemum-Vaccinium) were found on the lighter, and more acid sands and sandy loams.

Using the understory and older tree seedlings as indicators of succeeding forest types it was found that on the Vaccinium and Maianthemum-Vaccinium types white pine will reproduce itself if there is a good seed supply. Otherwise on these types inferior hardwood species, such as, red maple, gray birch, witch-hazel, and choke cherry will come in. On the Maianthemum and Rich Herbaceous types white pine will be replaced by dense stands of even-aged mixed hardwoods, such as, red and white oak, sugar maple, ash, and beech.

The results of the investigation should be of practical value to silviculture in that they should enable more intelligent management of the present stands by favoring the species best suited to the site and thus materially aiding its succession towards the most desirable composition.

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THE APPROACH OF NORTHERN HARDWOOD STANDS TO NORMALITY

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Ordinarily, when a normal yield table is applied to an understocked stand, the density of the stand is assumed to remain constant. This is largely done for simplicity because conditions do not warrant greater accuracy, but primarily because a satisfactory method was not available for correcting for the approach to normality. The author furnishes a method for adapting, to American conditions, an empirical method devised by a German forester, and shows how it is applied to uneven-aged stands of northern hardwoods.

NORMAL yield tables are available for practically every important timber species in the country. Although they have been prepared for fully stocked stands, they also have been applied to understocked stands. An understocked stand, say 30 per cent below normal, is assumed to remain 30 per cent below normal throughout its life. This simple assumption, however, never has been accepted completely by practicing foresters, many of whom feel that the density of understocked stands improves with age.

An understanding of the relationship between normal and understocked stands is important because such knowledge is necessary before normal yield tables may rightly be applied to understocked stands. So far no serious or careful attempts have been made to study this mooted question. The exact rate at which understocked stands approach normality is not known. Because of the time and expense involved, the establishment of permanent sample plots adequately to study the growth of partly stocked stands is practically out of the question. Consequently there is a definite need for the development of some simple and yet

reasonably accurate method of predicting the yields of understocked stands.

In April 1934, the author¹ brought to the attention of American foresters Prof. E. Gehrhardt's² method of allowing for the approach of understocked stands to normality by means of the empirical formulae:

$$Z_r = bZ(2 - b) \text{ (tolerant species)}$$

$$Z_r = bZ(1.7 - 0.7b) \text{ (intolerant species)}$$

In these formulae, Z_r indicates the required periodic growth of the understocked stands for the next decade, b their present degree of stocking, (ratio of actual and normal basal areas), and Z the corresponding growth as shown by a normal yield table. The numbers in the parentheses are empirical constants determined by special studies which showed a definite relationship between growth per cent and density of stocking.

The application of these formulae to actual stands is comparatively simple. For example, according to the yield table, the basal area at 50 years, of a normal aspen stand on a medium site is 122 square feet and for the next ten years the periodic annual growth is 60 cubic feet. An actual stand, on the other hand, of

¹Gevorkiantz, S. R. The approach of understocked stands to normality. Jour. For. 32: 487-488.

²Gehrhardt, E. Ertragstabeln für reine und gleichartige Hochwaldbestände von Eiche, Buche, Tanne, Fichte, Kiefer, grüner Douglasie und Lärche. 2 Aufl. Berlin. 1930.

the same age and growing on the same site and having a basal area of only 80
 80×60
square feet, would not grow $\frac{\quad}{122} =$
39.3 cubic feet per year, as it is common-
 0.7×80
ly assumed, but 39.3 $(1.7 - \frac{\quad}{122})$

= 49 cubic feet (according to Gehrhardt's formula for intolerant species), or only about 11 cubic feet per acre per year less than the normal stand. Should the present volume of this actual stand be 2,110 cubic feet per acre, in ten years its volume, based on this estimated growth, would be 2,600 cubic feet instead of 3,820 cubic feet, the yield of a normal stand. This, in turn, would mean that the stand is expected to gain about 2.7 per cent in its density of stocking because of its faster growth.

The applicability of Gehrhardt's formulae to our conditions of growth holds considerable promise. The Forest Survey data recently collected in the northern hardwoods throughout Michigan and Wisconsin afforded an excellent opportunity to test the applicability of the formula developed for tolerant species, namely

$$Zr = bZ (2 - b).$$

It is important to note that the formula does not consider age as a controlling factor in the approach of stands to normality, but is based entirely on the degree of stocking. This fact, therefore, does not prohibit its use in uneven-aged stands. The constant in this formula, which Gehrhardt determined to be 2, may be easily obtained from the relationship,

$$K = \frac{P_u + P_b}{P},$$

where P_u and P are the growth per cents of actual and normal stands respectively, and b , as before, is the degree of stock-

TABLE 1
BASAL AREAS PER ACRE AND BASAL AREA GROWTH OF NORTHERN HARDWOOD STANDS OF DIFFERENT DENSITIES AND AGES

Stand density	Cordwood stands			Saw-timber stands			
	Basal area per acre sq. ft.	Ave. growth per cent in basal area	Formula constant	Young		Old	
				Basal area per acre sq. ft.	Ave. growth per cent in basal area	Basal area per acre sq. ft.	Ave. growth per cent in basal area
Good	119.2	7.96	1.92	180.1	1.75	193.1	1.30
Medium	95.2	8.95	2.00	125.0	2.51	153.0	1.62
Poor	72.5	11.10		91.0	3.02	126.9	1.71
							Formula constant
							2.04
							1.98

ing, or the ratio of actual to normal basal area.

Table 1 presents basal areas and growth of northern hardwood stands for different densities and for different stages of stand development. The values are raw averages obtained by the Forest Survey from a large number of sample plots distributed throughout the northern parts of Michigan and Wisconsin. The basal area growth per cent values were obtained from increment core data as follows: If the 10-inch diameter class, for example, showed an average growth of 1.3 inches in diameter for 10 years, its basal area growth was computed from basal area tables as

$$\frac{.697 - .545}{.152 \times 100} = .152 \text{ square feet or}$$

$$\frac{.152 \times 100}{.545 \times 10} = 2.79 \text{ per cent per year}$$

These growth percentages were next averaged by diameter classes, using basal areas of each diameter class in the stand table as weights to obtain a weighted average for all diameter classes in each of the nine groups of stands presented in Table 1. Thus, 11.10 per cent in Table 1 is the weighted average growth per cent in basal area of all poorly stocked northern hardwood cordwood stands. Those stands which on the average were 39 per cent short in basal area as compared to stands of good density were considered poorly stocked.

Checking the constant in the formula was a matter of simple calculation. For poorly stocked cordwood stands the average basal area is 72.5 square feet and the

average growth 11.10 per cent. For similar stands of good density, which for all practical purposes may be considered as normal stocking, the corresponding figures are 119.2 square feet and 7.96 per cent. The formula constant, or

$$K = \frac{P_u + P_b}{P} = \frac{11.10 + 7.96 \times .608}{7.96} = 2.00.$$

The constants for other stands were computed in a similar manner.

The agreement between these computed values and the value 2 given by Gehhardt, is very striking, especially when one considers the fact that this agreement holds true for all stages of stand development. This check should be extended to other species and to other localities.

In short, since yield tables for fully stocked stands have but little present direct application because such stands are scarce, a method of predicting yields of partly stocked stands which would in some way allow for their relatively faster growth is urgently needed. A simple and direct method, already used abroad for converting growth of normal stands to fit the growth of actual stands, has been described here in some detail, together with the procedure for obtaining the required correction on the basis of actual measurement. Once the true relationship between understocked and normal stands is understood; in other words, once the rate of approach of understocked stands to full-stocked condition is known, a sound basis for applying our normal yield tables to actual stands will be available.

DESIGN OF NATIONAL FOREST TRANSPORTATION PLANS TO MEET THE FIRE CONTROL PROBLEM IN NORTHERN CALIFORNIA

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The rapid revision, development, and extension of plans of transportation for California National Forests became a pressing problem with the advent of the emergency program. Accordingly, the work was undertaken as a major regional project. The principles and theories on which the work was based and the general procedure followed are briefly described as they were applied to the pine forests of northern California. Although the major emphasis was placed on the development of transportation systems to meet the fire control problem, the work was regarded as an integral part of comprehensive land-management planning.

THE systematic planning of National Forest protection-transportation systems was started in the California region in 1930, but up to 1935 it was carried along only on a small scale. At that time it was decided to speed up the work and enlarge its scope in order to get complete plans for the whole region into use at an early date. The general objectives were; first, the establishment of a correct basis for such plans, second, the development, for each National Forest, of specific, balanced plans for road development that would meet all needs. The work was organized as a joint undertaking of the Regional Forester's office and the California Forest and Range Experiment Station, as represented by F. P. Cronemiller and the writer, respectively. The planning organization already built up through two previous planning projects was enlarged and given special training for the job. Eight forests were slated for completion in the first year and thirty foresters, engineers, and draftsmen were engaged during the evolution of the main program. In addition to the administrative problem of organization, very real problems existed as to the principles on

which further large-scale planning should be based.

Fortunately, many of the requisites for proceeding with a major project on such a scale were already available in usable form. The experience and technique developed through the painstaking efforts of W. A. Huestis and C. L. Young in adapting and developing transportation planning from the model set up by Norcross and Grefe,¹ provided working hypotheses on which certain phases of the work could proceed. Show and Kotok had defined by fuel types or zones of inflammability the broad time requirements essential to successful fire control. These time requirements had been applied in Huestis' work; and the results of this application, as well as the original data, were available for review. Detailed cover-type surveys for most of the southern forests had been completed by the Experiment Station. Where these were lacking for the northern forests, Cronemiller was able to define and identify further Show and Kotok's broad fuel classes as zones of subclimate, which result from changes in elevation and exposure. Significant relationships between the number

¹Norcross, T. W., and R. F. Grefe. Transportation planning to meet fire control requirements. Jour. For. 29: 1019-1033.

²Show, S. B., and E. I. Kotok. The determination of fire control for adequate fire protection in the major cover types of the California pine region. U. S. Dept. Agr. Tech. Bull. 209, 1930.

and location of fires, area burned over, and cover type on the one hand, and the fire organization and transportation facilities on the other, already partially developed in previous planning work, added new perspective. C. L. Young had developed a plan for logging forest roads which would bring the road pattern up-to-date, and by means of which the driving speed and distance between any two intersections in the road network could be determined.

Although all these things were available, it was necessary to fit their application and significance into a set of working principles and to weigh the results in accordance with their probable accuracy which is most difficult of all. The principles set up to govern the project may be outlined somewhat as follows:

1. Successful forest management in this region depends so directly on effective control of fires that the essential provisions for the latter must continue to dominate the development of minor roads throughout great areas of National Forest. On this premise, road requirements to meet the fire problem can be accepted as an excellent primary guide for developing the road network. The necessity of roads for other purposes then serve to modify or supplement this network in proportion to their importance. Where their importance exceeds the need for fire control facilities, they should in turn assume the primary control.

2. Fire control requirements must be based on (1) the need for speeding up the first attack on fires in proportion to their threat; (2) the need for enabling each National Forest unit to function more effectively as a self-sufficient protection unit, so that full available man power and equipment can be mobilized quickly

at one danger spot when needed; and (3) the need of roads strategically located for carrying out the most effective tactics in fire suppression where runaway fires are likely to occur.

3. Time standards or "hour control" standards, since they direct attention to the speed of action necessary for successful fire control, are an essential guide in designing a network of roads to meet such needs. As developed in this region, these "hour control" standards represent the best information that can be drawn from past experience. As such they are significant, and can be regarded as the best available indicator of the minimum available attacking forces necessary where fires are likely to occur. But they must not be regarded as providing a complete formula which is fully satisfied by the mechanics of placing *one man at any point* in a protection area within a *prescribed time interval*. The strength of man power at hour-control time centers should be based independently on known elements of the fire problem in that vicinity and checked by reference to the prevailing practice from which the time standards were evolved.

4. Theoretical road patterns can be very useful in teaching an understanding of the effect of networks of roads under ideal conditions. The hexagonal pattern set up by Norcross and Grefe was useful in this respect. Unmodified, however, it proved a definite handicap to the establishment of a logical network where bands of different fuel types occur one above another, as in mountain territory. Study of the characteristic relationships between the topographic pattern and the ideal pattern can serve a more useful purpose.³

5. The general philosophy adopted toward the question of financial limitation

³This conclusion is supported by an unpublished progress report in which a detailed mathematical analysis is made of road patterns giving most economical coverage under various conditions. The hexagonal pattern satisfies only one set of values and produces a broken and illogical network if applied arbitrarily.

of investment, which of necessity looms large in planning a road network, may be expressed about as follows: "Let's see first what facilities are actually needed to hold down fire control losses to an acceptable minimum, then we will examine costs to see how far we can reasonably go."

In the work described, relative costs of routes entered directly into their selection, but the first emphasis was the development of the picture of complete facilities in proportion to the problem represented. At a final conference, the resulting relationship between costs and values at stake was then carefully examined and combined judgment was exercised in reducing or supplementing the investments called for and in setting up relative priority for immediate construction.

For the southern California forests, the same principle but a different method was used. The resulting procedure is described independently in a following article.

PROCEDURE

With these principles clearly recognized, a great deal of caution was used in applying exact or arbitrary formulae to solve the individual problem. The method became that of first obtaining a clear picture of the existing road system. This was done by conducting a complete road-log survey as follows: speedometer distances between all intersections and to points en route and the average driving speed were obtained for every mile of road in the National Forest system. In the process the Forest road map was corrected and brought up to date.

The second important source of information consisted of the hazard map. In the typical Sierra profile, the hazard groupings by hour-control classes repre-

sent "life zones"⁴ that are very definitely controlled by elevation and exposure. For this reason even where cover type maps were lacking, a preliminary separation could be made on the sole basis of a topographic map. In the field, such preliminary classifications were checked and corrected incidentally to the road logging project. As a result, there was available, when the road-system survey was complete, a map showing a true picture of the existing transportation system and, a map showing by different colors the classification of cover types into four inflammability zones that were identified with the time-standard study as requiring the following travel time in first attack: (a) less than one-half hour, (b) less than one hour, (c) less than two hours and (d), two to four hours.

With these two maps furnishing rates of auto travel and indicating speed requirements in first attack, the next important step could be taken. This took the form of a detailed office compilation by which the transportation planning coverage method was used to show the degree to which the existing organization could put one or more men on a fire at any point in the area within the "hour control" limits assigned. This was accomplished by a speeded-up technique but followed the general procedure evolved in the Norcross plan by which a representative rate of cross-country foot travel was introduced, and strips of country adjoining roads were shown as covered to a width which depended on the time remaining in the assigned time limits at successive points along the road and on the assumed rate of foot travel. The result was a map showing the degree of accessibility by time contours (isochronal lines). All areas that could be reached within the time standards assigned were blocked in in heavy color; those areas

⁴Merriam, C. H. Laws of temperature control of the geographical distribution of terrestrial animals and plants. *National Geographic*. 6: 229-238, 1894.

which could not be reached were left in the light tint of the time zone. The latter thus stood out as "holes" in the coverage resulting either from insufficient access by roads or unstrategically placed man power. Owing to the extreme variations in foot travel in mountainous country, many artificial elements enter into such a map. Furthermore the holes vary greatly in significance. But in spite of these limitations, the graphic nature of this map makes it a valuable part of the evidence and an important guide in the field work.

Next, special attention was given to the evidence furnished by the history of past fires within the area. This was compiled for use in two ways. The record of where fires started was first introduced. This was in the form of a map zoned to show more clearly the various degrees of occurrence by localities. Such data were already available from compilations made for the earlier detection-planning projects. In territory where man-caused fires are the chief risk, such maps are very significant and often show conclusively the specific localities where the speeding up of fire-control effort will buy the most protection. Fine distinctions were not made in this classification, only low, medium, and high degrees of risk were recognized. These classes represent a history of occurrence of fires per thousand acres per 10-year period as follows: (1) less than one, (2) one to five, and (3) more than five fires. This map was the best available forecast of the amount of fire business to be expected in each locality. The second record of fire history was in the form of a map showing by years and decades, the territory burned by fires that had reached 40 acres or more. This took on special significance when checked against the hazard classification map, the risk map, and the coverage map on which was shown the degree to which the existing organization could meet the hour-control standards. It therefore served as an excellent final check on the data used. In

general it checked closely with hazard zones, in that burned area was almost entirely confined to the areas classified as of high hazard. The individual histories of exceptional fires usually revealed the influence of special factors. In general the map of burned-over areas revealed for the forest and by localities, the existing weaknesses in provisions for adequate speed or strength of attack.

At this point there was then available a good picture of where fires had been starting, and where they had been getting out of control. By means of the coverage and hazard map, some evidence of whether the weaknesses of the existing organization were due to lack of transportation facilities for quick attack, or lack of strength or mobility of man power were obtained. Only by an examination of the history of many of the fires could their individual significance be judged. The net effect, however, was a conclusive demonstration that uniform accessibility of each acre in each fuel type, and uniform ability to place one man there in certain time limits, were far from the complete solution. In many cases during the last 25 years, prevention of runaway fires in certain local valley territory would have yielded adequate protection to great areas of back country in the typical Sierra forests. In other localities the lack of prompt detection had been a prominent factor. In many hazardous localities where transportation had long been within prescribed hour-control limits, lack of adequate strength of initial attack appeared to be the chief cause of past failures.

All this evidence made the existing coverage map only a part of a more complex but also a more informative picture. The task, then, of improving the existing transportation system became not just a task of filling in the uncovered territory; but of providing a balanced transportation system, designed to fit not only the distinctive problems of each

locality but to conform as closely as possible to accepted fire control action.

With such a background, the evaluation of individual projects could be begun. The first step was to assemble on a topographic map all existing recommendations for all road projects. Then the roads needed to fill holes in the coverage, or to improve reinforcement action were fitted in. These were tentatively worked out on the map and sketched in in relation to topography, and the purpose for which they should be designed.

The major field job for which all this gave form and direction could then proceed. This compilation was taken to the field, and every route was examined on the ground to determine its feasibility, its approximate cost, and its value to the major plan. Field data from these examinations were recorded on "road reconnaissance" forms designed for the purpose. They gave such essential data as general location of the route, the elevation of key points, distance, and by sectors the class of clearing, the average side slope, and the per cent of rock. Various guides were developed, and a preliminary training school was held to insure reasonable dependability and uniformity of these data. Later, for permanent reference, these sheets were given reliability ratings according to the degree to which such data could be obtained "in place" for the location.

Such examinations were carried forward usually by two men on each forest. A third man, also trained in the field work and acting as compiler, plotted each proposed location and tested its value in the system by determining both its coverage and its relationship to the arterial system. He had to keep abreast of or ahead of the field work to insure economy of effort.

It was impracticable to judge finally the value of an individual project without first giving detailed attention to the location and function of fire guards and

other suppression forces. Where road and man power had already been fairly well provided, the realignment consisted of testing existing and potential suppression locations for coverage. This was done by sketching the territory reached in the prescribed time limits on tracing paper. These individual coverage overlays, comparable to detection-coverage overlays, gave a ready comparison of the total territory covered by the existing roads. Cost and feasibility of proposed road projects could then be balanced against their contribution. Usually the existing guard location could be much improved in efficiency by additional road development. Often it must be changed to obtain the most effective development of roads and the cheapest accessibility. The individual value of the various locations not only had to be taken into account but the relation of the various locations to each other. By permitting flexibility in making combinations, the overlays facilitated determination of these questions for each locality. The coverage of stations already permanently located such as administrative headquarters, lookout fireman stations, or improvements for other purposes was first improved by road development wherever this was practicable. Additional stations were then fitted in by the overlay method. Considerable overlap was permitted in high risk country, whereas the additional station necessary to show full coverage in back country was often deferred or sometimes entirely omitted, if fast crew attack could be provided.

In areas of high risk and high inflammability, where fires were difficult to control, and where feasible provisions for fast reinforcement action in attack were lacking, crew stations were set up to strengthen the protection system. The man power to be provided at these stations was determined by local conditions. In general crew stations were limited to the areas of abnormal hazard and to

strategic locations needed for quick reinforcement centers. The number of men to be assigned to individual stations was left on a tentative basis for further administrative check. The chief distinction in the plan was between the one-man station and the organized crew station.

Many rugged areas were found where the prescribed accessibility by road was clearly not feasible. Other territory in which chaparral predominated also required special attention. These areas, which were outlined or crosshatched on the map to give them special prominence, were treated as special problem areas. Where hazardous chaparral cover only was involved, special provisions were made within the area to make it accessible to firebreak crews, and for strategic location of road routes as dictated by what appeared to be the best fire strategy. Where extremely rugged topography was an additional factor, it was often possible to bound the territory by roads and to cut down the size of an inaccessible block by means of trails or firebreaks.

After a final transportation and man power plan had been developed in this way, a conference with the supervisor and members of the Regional Forester's office was called for a joint review of the plan.

At this conference individual projects and the plan as a whole was reviewed in some detail, and decisions were made establishing the priority of many projects and fixing the priority of the man-power positions. Further study is still needed to define better the number of men tentatively set up for each guard station. A study of the priority of road projects has since gone forward to guide selection for current construction.

With the acceptance of the plan, the final step was the compilation of the plan maps and all supporting data in permanent reference form and preparation of a final report.

In brief, the approach may be described as beginning with conditions, facilities, and existing proposals on the ground, rather than the more mechanical tests of coverage and of adequacy. Accordingly, the maps of coverage for the several National Forests concerned do not show uniform percentages of area covered, nor uniform spacing in the placement of suppression forces. However, it is believed that the basis used is sufficiently sound to stand the test of time. The data are available by which the approved plans may be amplified in many details as the need arises in the future.

BRIEFER ARTICLES AND NOTES

FORESTERS STAGE FINE MEETING WITH SOUTHERN AGRICULTURAL WORKERS

The thirty-eighth Annual Meeting of the Association of Southern Agricultural Workers was held in Nashville, Tenn., on February 3-5, 1937. Notwithstanding floods along the Ohio and Cumberland Rivers and the threat of forest fires in other regions, there was a record attendance of foresters at the meeting. More than 70 delegates were registered and it is believed that this is an all-time attendance record. A special invitation had been sent to the more than 600 members of the Society affiliated with the Appalachian, Southeastern, Gulf States, Ozark, or Ohio Valley Sections, and it is believed that this was largely responsible for the large attendance.

Although the strictly forestry program was confined to two afternoon meetings, foresters took active parts in several other section meetings. Earl W. Tinker, Division of State and Private Forestry, U. S. Forest Service, Washington, D. C., spoke at the general meeting of the Association on the subject, Place of Forests, Their Management and Use in the Social, Agricultural, and Industrial Economy of the South. Mr. Tinker made a plea that agricultural workers in the South recognize the production of forest crops as a permanent enterprise.

R. W. Graeber presided over the Forestry Section meeting on the afternoon of February 3, which was in the form of a symposium on European forestry. Papers were presented by C. L. Forsling and A. O. Weidelich. Following this symposium, Regional Forester Kircher discussed the

policies and program of Region 8 and answered questions from the floor regarding the Forest Service program.

At the banquet on the evening of February 3, President Chapman was the main speaker. In a stirring address he urged that the foresters retain their professional attitude on controversial questions. Reports were presented by delegates of each of the Society sections.

Other speakers at the banquet included W. K. Williams, W. R. Mattoon, H. B. Brown, newly appointed Assistant Secretary of Agriculture, and Dr. Neel, President of the A.S.A.W.

W. H. Wahlenberg presented a paper at the pasture symposium, and Dr. C. F. Hursh and H. G. Meginnis read papers before the water conservation symposium. R. K. Winters took part in the agricultural economics roundtable discussions.

The following papers were presented at the afternoon meeting of February 5:

Making Use of Forests and Forest Trees in the Program of Erosion Control, by Richard Kilbourne.

Naval Stores a Cash Crop, by C. H. Coulter.

C. E. Brehm, Extension Director of Tennessee, spoke on forest products and their relation to farming.

The Needs for Research in State Forestry, by Prof. L. Wyman.

Forestry Essential in the Basic Curriculum of Agriculture in the Southern Agricultural Colleges, by Prof. R. W. Hayes.

R. W. Graeber, J. S. Holmes, and G. H. Lentz were unanimously reelected Chairman, Vice-Chairman, and Secretary, respectively.

A record was set by the foresters this

year, and it is felt that forestry was really put on the map. These meetings of the A.S.A.W. serve as a meeting place for all agricultural workers in the South, and it is urged that foresters in the southern states keep up the interest they showed this year to the end that forestry may take its proper place in the agricultural program.

G. H. LENTZ,
U. S. Forest Service.



SUSTAINED YIELD AND SUSTAINED MARKETS

One hears much in these parlous times about sustained yield. Certainly the seed sown by Mason years ago has borne fruit. His discussions have provoked and stimulated much thought, and doubtless, considerable action. Our chief concern generally has been about yield or quantitative production in forestry as well as in agriculture and other forms of national production. The entire agricultural program for years was predicated on the theory of more and better crops. Similarly forestry was concerned with growing enough wood to meet what we believed to be the requirements of our present and prospective demands.

The very essence of sustained yield means sustained production. This means sustained industries, which in turn mean sustained payrolls, and this in turn means sustained communities with sustained happiness, welfare, and prosperity of our people dependent upon forest industries. We are all agreed that this is very proper and very well, but foresters have contributed relatively little toward the maintenance and stabilization of sustained markets. We have assumed that if we had sustained production we would have sustained consumption. Most of us have taken for granted the fact that the market demand would take care of the production. Our per capita consumption fell

more than 50 per cent between 1909 and 1929, and since then it has almost collapsed, the low point occurring in 1932, when instead of a normal 38,000,000,000 board feet of lumber we used but a little over 10,000,000,000 feet or only 26 per cent of normal. Although population and the use of substitutes in many forms of construction have increased substantially over a period of several decades, prior to the depression, there had been a gradual falling off in lumber consumption, from the peak of 46,000,000,000 feet in 1909 to a low of a little over 10,000,000,000 feet.

Forest products are generally sold under a very intensive system of competition. One needs only to engage in the lumber or any other forest products industry to realize and appreciate this. Meanwhile vast sums are being spent to determine better methods of increasing production—to grow more and better timber. This is very proper and should be encouraged, but little is being done to increase or even maintain consumptive capacity of our markets. Perhaps we may have an embarrassment of forest riches. If we do have a surplus beyond our domestic requirements we must continue to further develop our export business in lumber and timber products. In this field we come into active and intense competition with wood produced in the other great wood producing countries, principally Sweden, Russia, Canada, and Finland. As with our surplus wheat and other agricultural products, many have felt that the foreign markets would easily absorb our surplus. However, we are learning that this is not so easily accomplished.

Criticism without constructive suggestions for the remedy are not very welcome or helpful. So may I suggest the following points to which foresters should pay more and better attention?

1. Foresters must be vitally interested in holding, defending, and possibly ex-

panding the market for lumber and timber products. There is too frequently a laissez faire attitude toward this big question. Too many of us feel that this is a job for the lumberman or for someone else. Utilization is the very keystone of successful forestry practice, as has been demonstrated for years in Europe. Without developing, expanding, and increasing the markets for lumber and other forest products our forestry program may partly be in jeopardy. In former years, our forest experiment stations were generally concerned with silvics, problems of plant physiology, and similar subjects, all of which are in themselves excellent pieces of research perhaps, but do not necessarily deal with the really vital problems confronting us. It is encouraging to note now that the programs of our forest experiment stations are trending more and more toward the real business of the woods, which is in logging as well as in fire protection and some other activities. It has been said that we already know much more forestry than we can put into practice in the woods, but this should be taken with a grain of salt. It is comforting to know that some of our forest experiment stations are now concerning themselves with improving, developing, and lowering logging costs, especially in connection with selective logging studies. Lowered woods costs mean, directly, increased stumpage values; increased stumpage values result in increased profits and increased profits mean opportunities for closer utilization, better silviculture, and greater opportunities for employment. The Northern Rocky Mountain Forest Experiment Station has pointed out excellent examples of how much closer Idaho white pine is utilized in tops and stumps as a result of higher stumpage value compared with ponderosa pine or other lower value species and what is more important, members of this station have pointed the way to better methods and cheaper logging in the woods. The sta-

tions at Portland, New Orleans, and Berkeley also have been active and effective in various aspects of utilization.

2. Extending government aid through advice and perhaps financial assistance in improving the practice of private forestry. The government can borrow money at low rates of interest and its aid should be extended to private enterprise for the furtherance of better forestry practice, as well as to agriculture and other industries. The government should take an active interest in holding the markets for lumber. The government itself is a vast consumer of timber products. The purchasing policies of the government should have the advice of government foresters if you please, in increasing the use of wood and providing better opportunities for the sale of forest products.

3. Increased appropriations should be made available to the Forest Products Laboratory, Madison, Wisc., and other agencies seeking to promote and broaden the usefulness of timber products.

4. Devising new outlets for and methods of utilizing additional wood, together with reducing a larger portion of the present wastage. The increased demand for plywood, fibre boards, etc., have been outstanding examples of the reverse of the downward curve in consumption of most of our forest products. Possibly wood gas for motor fuel may be developed together with improved stoves and devices for using wood as a fuel. When gasoline costs from 0.50 cents to \$1.25 or more per gallon, as in Europe, there is a definite urge to develop wood gas; but much better methods must be developed than those now in use in making wood gas in Europe in order successfully to introduce this method in this country.

Some individuals have seriously criticized the "cut and get out" and the "boom and bust" phases of the lumber industry. These distressing and often tragic conditions are not to be defended, as they cer-

tainly do not contribute to the present or future prosperity of our country, but these boom and bust days were natural expressions of our public and private prodigality and apathy in handling our natural resources. The "American way" has generally been a wasteful and reckless way. We have had "boom and bust" days in the handling of our agricultural soils, as well as in our mining and grazing lands, in oil, real estate, reclamation projects, and other developments. Perhaps they have been natural expressions of the American system of pioneering and exploitation of abundant and low value resources. They are not being excused or defended, but we may take lessons from these conditions and improve upon them for the future. The hue and cry about boom and bust days sounds like a bit of sheer sentimentality, perhaps of "rabble rousing" or the shout of the demagogue, which recently proved to be a "cry in the wilderness". The gap between the forester and the lumberman is disappearing. This is not the time to widen the breach, if such there be. Each needs the other. Both should seek the same ends. All of these questions are intimately integrated with the question of sustained markets, which in the opinion of the writer are as important, even if less immediately tangible, as sustained production. Sustained yield without sustained markets, locally, regionally, or nationally is unbalanced and contrary to wise and forward-looking public policies as well as to good forestry practice.

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TRACTOR LOGGING IN THE GULF COAST REGION

The heaviest and most accessible stands of timber in the Gulf Coast region are rapidly being cut. Most of the remaining

stands are not only lighter, but more widely scattered. To profitably log these poorer stands, much more flexible equipment than even the mobile steam skidder commonly used in the South is necessary. Tractors and tractor equipment seems to be solving this problem, as shown by the following operation.

On this particular operation, eight Diesel 50 caterpillar tractors each equipped with a skidding winch are being used. Many other makes are being successfully used in other operations. For the better stands where the expense is justified, logging railroads are built from one-half to one mile apart, and the logs skidded to the railroad with tractors or different combinations of tractor equipment.

On short hauls in open woods, distances one-half mile or less, direct ground skidding, or skidding with a steel pan, or with a high arch equipped with caterpillar treads is the most efficient method, depending on the distance. For distances less than 700 feet, ground skidding directly to the railroad is the most efficient method. One "Cat" with a three-man crew, consisting of an operator, hooker, and rear rider, skids from 25 to 35 M board feet per day. For distances over 700 feet but less than one-half mile, a 6 x 9-foot steel pan with upturned front reduces ground friction and speeds up the operation. With this method, the output varies from 10 to 15 M board feet per 10-hour day. But even more efficient than the pan is the fairlead arch equipped with caterpillar treads. Because of the further decrease in ground resistance by the elevation of the front ends of the logs, the arch can haul almost twice as much. These loads vary from 1,600 to 2,000 board feet.

In cypress sloughs or other areas where the ground is too wet and soft, the logs are ground skidded to high land by tractors equipped with winches and from 300 to 500 feet of 5/8- or 11/16-inch

skidding cable. An extra man is usually used to help carry the skidding line to the logs.

On long hauls in rough woods, distances one mile or more, a combination of 30-ton wagons equipped with caterpillar treads and tractors is being operated very efficiently by using a "Cat" to haul the wagons and others to bunch and load. These wagons carry from 3 to 5 M board feet per load. On one swamp and hammock logging chance, tractors were used to bunch the logs in a well cleared loading ground where one wagon was being loaded by a crane equipped with caterpillar treads, while the other was being hauled to the railroad. Here the logs were loaded on the cars by a steam jammer. On this particular logging chance, the cost of skidding from the stump to the railroad and loading on the car was \$3 per M board feet.

Small isolated stands are logged by bunching the logs along truck roads with "Cats", and hauling them to the railroad or directly to the mill by truck.

Caterpillar skidding costs vary widely, varying from 50 cents per thousand on short hauls in open woods to as high as four dollars per thousand on long hauls in swamps and other difficult logging chances. The "Diesel 50" burns about 15 gallons of fuel oil per 10-hour day at a cost of about 6 cents per gallon.

Total repairs run about \$1,200 per year. Any operator will do well to confine equipment to one make, as repair parts are then interchangeable and operators can be used on any machine.

In order to protect reproduction and the residual stand, tractor logging becomes almost a necessity for selective logging. Logging by mules and horses would be the only other alternative.

M. W. HITCHCOCK,
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A NEW BLACK LOCUST SEED TREATMENT

The exceptional value of black locust, *Robinia pseudoacacia* L., for erosion control plantings emphasizes the desirability of obtaining prompt and complete germination. Because black locust seed is characterized by retarded germination, various seed treatments have been devised to induce germination. The more common treatments are soaking in tepid or hot water, mechanical scarification, and sulphuric acid treatment (chemical scarification). These treatments have given a wide range of results varying with the differences in age as well as source of the seed. All experiments have indicated that an impermeable seed coat was the cause of delayed germination. Believing that a waxy covering might be responsible for this impermeability, the following experiment was undertaken in 1936 at the University of Idaho, School of Forestry.

Different lots of weighed seeds, gathered from the same source in northern Idaho, were treated individually in Soxhlet extractors with xylene, ether, acetone, chloroform, ethyl acetate, and benzene for two-hour periods. Five 1/20 samples of each extract were evaporated to dryness on weighed watch glasses to determine the relative amounts of wax dissolved from the seeds by each solvent. The losses of weight by the seeds were found in each case to be approximately 20 times the average weights of the residues deposited on the watch glasses. Weighings were made to 0.0001 grams.

The results of this procedure showed that there is a waxy substance on the seeds of black locust which can be removed by wax solvents. Deposited on the watch glasses was a brown wax of uniform texture having much the appearance and characteristics of beeswax. The seeds before treating were shiny or glossy, but after treatment they were dull.

The largest amount of wax dissolved from equal amounts of similar seeds in

the same length of time under similar conditions was by xylene followed in order by ether, acetone, chloroform, ethyl acetate, and benzene. Because of their dissolving properties and comparative cost xylene, ether, and acetone were used to test the effect of dissolving the wax upon the germinative capacity and germinative energy of the seeds.

Duplicate samples of 200 seeds each were soaked separately in xylene, ether, and acetone for periods of 10 minutes, 30 minutes, 60 minutes, and 120 minutes. At the end of the stated time each set of seeds was removed from the solvent and after washing several times with fresh solvent were allowed to dry on absorbent paper. Each set of seeds was planted in sand in a greenhouse and covered with $\frac{1}{8}$ to $\frac{3}{16}$ inches of sand. For comparison similar sets of seeds were treated with hot water according to common practice, others were scarified in a sand-paper scarifier, and one lot was planted without treatment. The results are shown in Table 1.

It is concluded that black locust seeds are covered with a thin layer of wax, the removal of which increases the rate of germination and the total percentage of germination and decreases the time required to reach maximum germination. The wax on the seeds may be removed by dissolving it in xylene, ether, acetone, chloroform, benzene, and ethyl acetate (and possibly other solvents) the first three of which are most effective. The effect of scarification may be the mechanical removal of the wax on the seeds.

Therefore, the writer believes that the waxy seed covering is probably partially responsible for delayed germination of black locust seed. Its removal either by wax solvents or mechanical scarification simplifies the methods of hastening germination and results in a higher total germination. This also eliminates the recognized disadvantages and uncertainties of sulphuric acid and hot water treatments.

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TABLE 1

SUMMARIZED TABLE SHOWING AVERAGE PERCENTAGES OF GERMINATION OBTAINED FROM DIFFERENT TREATMENTS

Solvent	Time treated	Per cent of germination				Total per cent germination	Days required to reach maximum germination
		In 3 days	In 5 days	In 10 days	In 15 days		
Xylene	10 minutes	0	27	62½	65	66½	19
	30 minutes	2½	29½	66½	68½	69½	20
	60 minutes	4	35½	70½	71½	74	20
	120 minutes	5½	36½	68	68½	69½	19
Ether	10 minutes	1	31	59½	62½	64	20
	30 minutes	6	41	65	68½	69	18
	60 minutes	3½	41	66½	69	69	15
	120 minutes	4½	33½	66½	71	72	19
Acetone	10 minutes	0	23	60	64	65	16
	30 minutes	4½	34	63	65½	67	20
	60 minutes	5	38½	62½	65	66	19
	120 minutes	5	36½	63½	65	67	18
Hot water, 65° C.	24 hours	0	25½	58½	62½	63	16
Hot water, 95° C.	24 hours	0	½	½	½	½	5
Scarification	10 minutes	0	41½	70½	75½	77	18
Control		0	0	0	0	60	27

FLUMES ON THE DUINOIR TIE SALE

The story of "the drive" of the Wyoming Tie and Timber Company is both interesting and spectacular. Moving the ties one hundred miles down Wind River is, of course, the best known part of the operation. Getting them to the river is the big problem of the company.

The Wyoming Tie and Timber Company has been operating on Warm Springs Creek for about eight years, despite the fact that the name DuNoir still clings to the operation. Both the north and south forks of this creek are drivable, in high water, to the headquarters camp at DuNoir. From here to the Wind River, a distance of over six miles, the creek flows through a narrow rocky gorge and at one place passes beneath a natural bridge. Driving is impossible here, so a flume was constructed through this six and one-quarter mile canyon.

The lumber for this flume was cut by two mills established near the head of the canyon. As construction progressed the sawed material was floated down as needed. Brackets were cut out and assembled at stations along the flume, then floated down ready for installation.

The extreme ruggedness of the canyon made this construction a real engineering feat. At one place the flume was suspended from the rim rock by means of cables. This proved unsatisfactory, and a safe and secure footing for legs had to be provided nearly sixty feet below. Cables are still used to support the flume through the passage under the natural bridge. Each spring new legs are put in at points where ice has carried them away.

The main flume is of the V-type, as are all the flumes on the sale. It is thirty-six inches deep except on curves and below steep pitches where it is deeper. The brackets are of 2 x 4 and 2 x 6 inch stock placed six feet apart. The main sills are

of varying sizes; many are poles in the round. The trough is double boarded throughout and metal strips are put in on curves to relieve the wear on the sides.

Under favorable conditions, ties can be fed in at the rate of seventy ties per minute. It takes just twenty-four minutes for a tie to travel the length of the flume. Over sixteen hundred ties may be in the flume at one time. Observation stations are located at various points of vantage and five telephones are connected along the canyon so the feeders can be notified immediately below steep grades where the ties pile up and jam. The average fall of the flume is 5 per cent, but there are places where the drop is as much as 16 per cent. Serious breakdowns are not frequent and between thirty and thirty-five thousand ties are usually flumed in a nine-hour day.

In addition to this main flume, four small flumes have been built along "undrivable" tributary streams. These total about six miles in length. The creek flumes are similar in construction to the main flume, except they are but twenty inches deep and are not so rigidly supported. The fall in these varies from 3 to 30 per cent. It is most spectacular to watch ties sliding down the Canyon Creek flume to its junction with the main flume. This is the steepest of all the flumes, and in order to retard the speed of the ties and prevent them from seriously damaging the main flume where they enter it, a supplementary sluice is provided. This pours a supply of water into the small flume about forty feet from its junction with the main flume. The water flows much slower than the ties, thus serving as a brake and causing the ties to float into the main flume at a reduced speed.

This system of flumes represents a heavy initial investment and the annual upkeep plus the necessary labor for fluming is considerable. How long will it be before improved motor trucks will prove

a more economical means of conveying timber products to market, and fluming and driving will be but colorful memories?

EDWARD B. WILLIAMS,
Washakie National Forest.



CHAIN SAW FOR GIRDLING

Figure 1 illustrates a tool for girdling trees, designed some years ago by Ellwood Wilson of Quebec. Mr. Wilson says it has been used with considerable success in that region on poplar and birch up to 12 inches in diameter by private companies and the Dominion Forest Service. H. L. Churchill of Finch Pruyn Co., Inc., Glens Falls, N. Y., who has had wide experience in girdling, has found it more satisfactory than an ax on trees up to 8 inches, especially maple and birch.

As the tool is not well known either in Canada or the United States, it is thought advisable to call attention to it in view of the present and prospective increase in girdling in both countries to improve the condition of stands of timber. The tool consists of a piece of special type chain saw 25 inches long with a handle attached to each end. Three layers of links with teeth, riveted together, saw a kerf approximately $\frac{1}{4}$ inch wide. The teeth on the outer layers have a slight set, but the raker teeth on the middle layer are without set, all teeth being alternated along the chain so as to evenly distribute the cutting and raking. The operator faces the tree, saws through the bark and cambium on the far side, and then by changing position part way around the tree is able to saw the near side. The saw does not jump out of the kerf in the operation, and a neat, complete girdle results. The tool weighs only 18 ounces, and could by redesigning the handles probably be reduced in weight still more. Moreover, it does not require

the skill required in girdling small trees with an ax.

JOHN B. CUNO,
Forest Products Laboratory.



A CUBIC-FOOT CALIPER SCALE FOR CORDWOOD

Most commercial timber estimates in the United States are concerned primarily with the measurement of the board-foot scale in sawlogs. When utilization becomes closer, however, other portions of the tree assume financial importance and the timber cruiser or scaler therefore

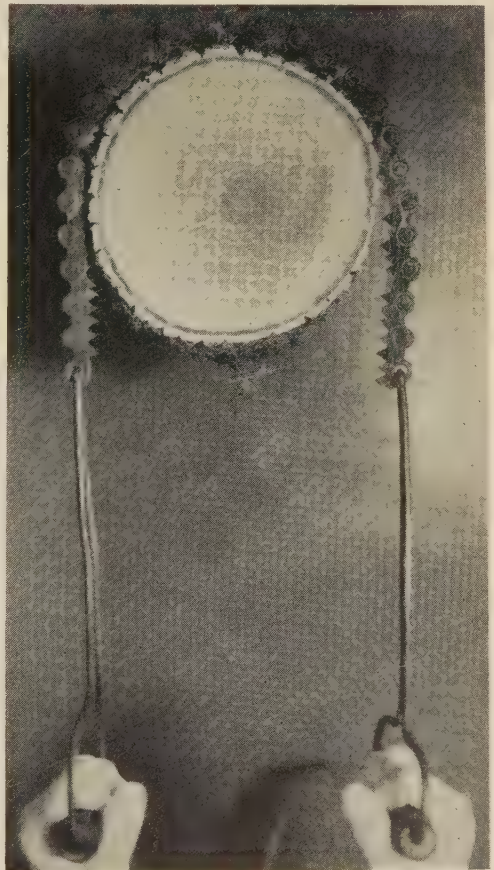


Fig. 1.—Chain saw for girdling trees.

finds it necessary to develop methods and equipment for the scaling of these other products.

In a timber utilization study undertaken in southern Iowa during the winter of 1935 and 1936, a simple and direct method of determining the volume of cordwood contained in the tops of trees which were cut and left for working up later was found desirable. Sawlogs could be scaled by the Scribner rule and fencepost cuts by a standard rule in use in the locality.¹ However, the volume and value of the fuelwood in the top of a large, somewhat open-grown white oak is too great to be disregarded in any estimate of its contents.

To eliminate the tedious field and office work entailed by measurement of diameters, a shortcut method of equal accuracy was devised. A similar method has been used with considerable success in the measurement of pulpwood in the northeast.

Calipers, calibrated with a cubic-foot scale, giving the cubic-foot volume for four-foot bolts by Huber's formula, were applied to the middle of each bolt outside the bark by measuring each branch every four feet and reading the volume to the nearest tenth cubic foot. No deduction is made for bark because it is included in fuelwood sales.

The figures obtained are sufficiently simple so that the estimator can carry them in his head, recording the sum when a tree is completed. The only office computation required is the changing of cubic feet to cords and fractions thereof for each tree or other unit in terms of which the results are desired. In this study a factor of 100 cubic feet per cord was used, which required only a shift-

ing of the decimal place two places to the left to convert to cords.

JOSEPH B. ELY, JR.,
U. S. Forest Service,
Keosauqua, Ia.



SAWTIMBER AND CORDWOOD VOLUMES IN CENTRAL AND SOUTHWESTERN MISSISSIPPI

Pursuant to its policy to make available brief findings of immediate interest while more lengthy reports are being prepared, the Southern Forest Experiment Station at New Orleans, La., has published Forest Survey Release No. 24 on the "Sawtimber and Cordwood Volumes in Central and Southwestern Mississippi".

This release deals with the part of central and southwestern Mississippi lying east of the Delta. This portion of the state includes all or parts of 28 counties and has a land area of 10,799,500 acres. Of this, 56 per cent is in some stage of forest growth, and only 30 per cent of it is in actual cultivation.

This is one of the most active sawmilling areas in the South. In 1934, there were approximately 661 sawmills in the unit, of which 582 were small operations with daily capacities of less than 20 thousand board feet. Other primary forest industries include 9 veneer plants, 13 establishments manufacturing cooperage, 5 making small dimension or other products, and a large production of poles, crossties, and pulpwood.

The principal trees in this section are loblolly and shortleaf pines, although hardwoods predominate in the bottomlands and in the rough, loessial country bordering the Delta. At one time or an-

¹Ely, J. B., Jr. A rule of thumb for fenceposts. Jour. For. 34: 379.

other, 95 per cent of the forest area was cut over for sawlogs or other forest products and, as in most parts of the South, second-growth stands now predominate. Forest Survey cruisers found that the sawtimber portion of the forest growing-stock totaled 6 billion board feet of pine, Doyle scale, and 5 billion feet of hardwoods. This estimate includes pines with a d.b.h. outside bark of 9 inches or more and hardwoods measuring 13 inches or over. The stand of good, under sawlog-size trees 5 inches or more in d.b.h. totals 34 million cords, composed almost equally of pines and hardwoods.

In the more comprehensive unit, state, and regional reports of the Forest Survey, the data, including estimates of growth and drain, will be analyzed to determine the prospects for the continuance of existing forest industries and the opportunities for new industries if the forests of the area are to be maintained in a continuously productive condition.

Of the 23 previous Forest Survey Releases, seven deal with turpentine timber supplies or gum naval stores production statistics in the Naval Stores Belt; one gives the supply of longleaf pine stumpwood for wood naval stores in four southeastern survey units; 11 deal with the cordwood volume (or sawtimber and cordwood volumes) of pulping and non-pulping species in survey units located along the southeastern seaboard or the Gulf Coast; one gives a preliminary summary of the forest resources of the Delta in northwestern Mississippi; one gives estimates on the amount of pole and pile timber in 4 southeastern units; one summarizes erosion conditions on the Norris Dam Watershed in the Tennessee Valley; and an early release describes the work of the Forest Survey in the lower South.

I. F. ELDRIDGE,
Southern Forest Survey.

DEATH OF RED OAK IN NEW HAMPSHIRE FOLLOWING DEFOLIATION BY TENT CATERPILLAR AND GYPSY MOTH

During the spring of 1934 a severe infestation of forest tent caterpillars was observed on the Fox Research Forest, Hillsboro, N. H., in a 55-year old stand of red oak, white ash, and red maple 6.2 acres in area which had been thinned the previous winter. All of the merchantable poplar in the stand was cut and peeled during the caterpillar season. The larvae were matted on the trunks like blankets, and made logging disagreeable to say the least. Following the removal of the poplar many of the oaks, smaller ones especially, were suddenly given much greater growing space. The thinning was what might be termed a heavy, low thinning, reserving all sawlog trees for which there was no market that year. The tent caterpillars appeared in May and were at their height in mid-June. The heaviest feeding by gypsy moths probably occurred in July after the tent caterpillars had pupated, but the two species worked together much of the time. Occasionally completely defoliated trees would bud out between the attacks.

The following year a second almost complete defoliation by tent caterpillars occurred, followed as before by gypsy moth attack. In the fall of 1935 some of the trees were already badly weakened. The tent caterpillars were not quite as numerous in 1936, but in another stand about one quarter mile away a heavy concentration of these insects had built up. This stand, 7.5 acres in area, was originally a very dense stand of paper birch with red oak, white ash, basswood, red and sugar maple, and beech in mixture. The average age in 1934 was 54 years. The paper birch was removed in the winter of 1934-35 at the rate of over 20 cords per acre, because it had suffered from an ice storm and was showing other signs of decadence. This heavy crown

thinning resulted in very sudden and severe exposure to the remaining stand of oaks, ash, etc., which were about 8-10 inches d.b.h., 55-60 feet high, and of excellent quality. However, it remained in very good vigor until the spring of 1935 when tent caterpillars first were observed in numbers in the stand. The attack of these insects in 1936 resulted in nearly complete defoliation of all species.

Dead red oak trees first became noticeable in both stands in the spring of 1936. The first signs of death appeared in a discoloration of the cambium and phloem on lower parts of the bole. By fall, borers had completed their work in the bark of many such trees. Some trees put forth leaves after the last defoliation, but they withered and died since the rest of the tree had been weakened too much to recover. These persistent dwarfed and withered leaves made it possible to recognize such trees even in winter.

Salvage operations were carried on during the winter 1936-37. In the first mentioned stand a tally of both living and dead trees was made at the time of marking with the following results:

<i>D. b. h.</i>	<i>Per cent dead</i>
5	69
6	75
7	44
8	57
9	36
10	46
11	54
12	53
13	16
14	28
15	0
16	40

Indications were that mortality was greatest in trees which had just been released by thinning, and higher in those on dry and exposed sites than those in coves and ravines. Death of oak was not confined to stands which had been thinned.

Roadside trees as well as trees in dense stands succumbed here and there in the two compartments which suffered from the insects. White oak as well as red oak was killed, and occasionally small paper birches, poplars, and white pines. Severe gypsy moth infestation was probably responsible for the latter trees being killed. In general white ash, basswood, and the maples were apparently unharmed by the defoliation.

The explanation suggested is that the trees with small crowns, suddenly set free by thinning, suffered from the "shock" of thinning and then were in a very vulnerable condition. Before diameter growth could increase it was necessary for the crowns to develop, which in the crowded stand had sufficed for the low respiration of the shaded bole. Respiration was no doubt increased by the cutting because of the higher temperatures, greater wind movement, and swaying. The crowns were barely large enough in the first place to store reserves for such long boles. This applied to the other species equally as well as to the red oak. The tent caterpillars defoliated all species nearly equally, but the gypsy larvae concentrated on the oaks. The oaks, consequently, were prevented from manufacturing reserve food supplies, which the other trees succeeded in doing, and in some cases could not even feed their extensive cambium sheath throughout the remainder of the summer.

There are other factors which may have been responsible for the death of the oaks. Little is yet known about the duration of drought injury and the lag which may occur before symptoms appear. There was evidence of dying oaks in the towns of Petersham and Athol, Mass., and also in Westchester County, N. Y., which was called to the attention of the writer by R. C. Brown, of the Office of Forest Insect Investigations, Bureau of Entomology and Plant Quarantine. Mr. Brown pointed out that in the last-named case,

the trees were dying from attack of an oak worm *Agrilus bilineatus* following canker worm infestation and probably drought injury. The trees at Athol were defoliated by gypsy moth, but showed earlier slowing of growth due to some cause. The trees at the Fox Forest continued to grow at a rapid rate up to the time of death. Another factor which may have caused the trees to succumb suddenly was the severe freeze of May 1936. On May 16th and 17th, for instance, minimum temperatures of 20° F. were recorded, and ice formed to the thickness of 1 inch in the open. Again from May 20th to 23rd there were heavy frosts. The heavy thinning may also have caused a drying of surface roots which led to a condition similar to the decadence noticed in birch following cutting. Perhaps too little emphasis has been placed on *Agrilus* and physiological factors.

The conclusion to be drawn from this minor forest calamity is obviously that heavy thinning of hardwoods containing

favorite gypsy moth host trees is unwise when tent caterpillars are near. In fact any thinning operation is liable to encourage them, because of the greater heat, light, and more succulent foliage provided. Secondly, as pointed out by Behre, Cline, and Baker¹ oak cannot be accorded a major position in the stand in gypsy moth country without running a risk of building up a formidable gypsy moth infestation. In the stands described, poplar and gray birch had been removed with a view to reducing gypsy moth damage. Thirdly it is probable that other factors contributed to the death of these trees. The defoliation by insects was most noticeable. Red oak has been, and still is regarded, as the best crop tree on the rich loam soils in this region. The finest sawlogs come from red oak. It is clear, however, that much greater care will be necessary in treating stands containing this species.

HENRY I. BALDWIN,
N. H. Forestry and Recreation Dept.

¹Behre, C. E., A. C. Cline and W. L. Baker. Silvicultural control of the gypsy moth. Mass. For. and Park Ass'n Bull. 157. 1936.



REVIEWS



William Willard Ashe (1872-1932).

By William A. Dayton. *Published by the author. 22 pp. Portrait. Washington, D. C. 1936.*

This biographical sketch records the life and major accomplishments of a forester who, while not so widely known as some, made an enduring place for himself in the memory of his coworkers and substantial contributions to the progress of forestry.

After relating briefly the principal biographical facts, the booklet mentions a number of Ashe's more important accomplishments in forestry and in botanical science. His record of fruitful research, mostly conducted in spare time while engaged in responsible administrative work, is impressive. More might have been said of the significance of his work in forest economics, particularly of the pioneer investigations which he conducted to determine scientifically the relative profits in cutting trees of different sizes and of the service which he performed by first calling attention, in publications dating as far back as 1914, to the practical importance of such determinations.

Ashe's professional work is summed up by the author in the following paragraph:

"Ashe in many ways was a true seer; he had the pioneer gift and spirit. He planted one of the first commercial stands of longleaf pine in North Carolina, and discovered the secret of its successful transplanting. He is credited with introducing the modern cupping system in the American naval stores industry. His monograph on loblolly pine has long been looked upon as a model. He is one of the real fathers of the forest acqui-

sition policy of the federal government. He was one of the first to recognize the need of forest research, and pioneered in the study of the relationship of forests to potability of streams. He was an authority on logging costs, forest economics, erosion, forest types, and the taxonomy of southeastern woody plants."

The booklet closes with a fifteen page bibliography of Ashe's publications, the titles of which testify to his astonishing versatility and industry.

The author of this sketch has served the forestry profession well in thus recording the life of one of its members whose modest and retiring disposition had much to do with preventing the full recognition that the originality of his thought and the keenness of his observations might otherwise have commanded during his lifetime.

W. CLIFFORD HALL,
U. S. Forest Service.



Lethal High Temperatures for Conifers, and the Cooling Effect of Transpiration. By Hardy L. Shirley. *Jour. Agric. Research.* 53: 239-258. 1936.

Shirley gives us a critical resumé of literature of the last 20 years on temperatures lethal for higher plants and on the protective effect of transpiration. His own experimental work consisted of a series of tests of heat application under well-controlled laboratory conditions, in part of which all possibility of confusion with drouth was excluded. Simple heat and drouth injuries should be easier to

detect than troubles with more complex causes, but in fact they are often confused with each other and it is frequently difficult to distinguish them from some other kinds of injury. Shirley's results not only add to the still inadequate information as to what external temperatures will kill plant tissues under different conditions, but also permit some inferences as to the symptoms to be expected in heat-injured conifers in the field. Although internal temperature measurements on seedlings at marginal temperatures would be desirable in any complete study, the determinations of the tolerance to high external temperatures such as he reports are a greater help for field diagnosis.

He used young red, white and jack pines and white spruce as experimental material. First-year seedlings were killed by temperatures as low as 112° F. when put into hot water for 5 hours, and 115° killed 1-1 transplants under the same conditions. It seems permissible to suspect that water immersion lowers the threshold of heat injury, not only by preventing transpiration cooling, but also by depriving the tissues of oxygen or in some other less obvious way; the fact that injury occurred at lower temperatures if the plant was entirely immersed than if root and top were immersed separately, suggests this. Tubeuf¹ reports killing bark tissues by water jackets in which the temperature was maintained for 88 hours at only 104° F. In Shirley's tests on plants whose tops were in moving air for 5 hours, with relative humidities approaching 90 per cent, temperatures around 124° were fatal; at humidities between 15 and 20 per cent the lethal tem-

peratures were around 129°. The results may be compared with those of Münch,² who put tender pine and spruce seedlings in a moistened incubator at 126° F. for 2-3 hours without injury, but at approximately 130° the uppermost parts of the seedlings were killed in 5 minutes. Münch's figures are less reliable than Shirley's, for as Münch himself points out, the lack of forced air circulation makes the exact temperature in his incubator uncertain. As might be expected, all of these results with conifers indicate much less heat tolerance than that found by MacDougal and Working³ for a cactus which continued growth at an internal temperature of 134° F., and resumed growth on cooling after having reached an internal temperature of 144°. Shirley considers that the tolerance of higher temperatures in the drier environments was mainly, if not entirely, due to the cooling effect of transpiration. He mentions, however, the known effect of increased concentration of salts in the cell sap in increasing the coagulation point. This is in line with the relative inefficiency of dry heat against fungi and bacteria in sterilization processes, under conditions in which there is no possibility of the microorganism's being materially cooled by evaporation, and indicates that the adjustment of protoplasm to reduced water content may incidentally result in greater tolerance of heat.

Injury was more closely related to age of tissue or organ than to species or age of plant. The more sensitive parts of the trees were killed at temperatures as much as 10° below those required to kill all exposed parts. Needles were more susceptible than stems, and fibrous roots

¹Von Tubeuf, K. 1914. Erkrankungen durch Luftabschluss und Überhitzung. Naturw. Zeitschr. f. Forst- u. Landwirtschaft. 12: 67-88; 161-168.

²Münch, E. 1914. Nochmal Hitzeschaden an Waldpflanzen. Naturw. Zeitschr. f. Forst- u. Landwirtschaft. 12: 169-189.

³MacDougal, D. T. and Earl B. Working 1921. Another high-temperature record for growth and endurance. Science 54: 152-153.

and young needles more than old needles. Buds were more resistant than needles in air, especially in dry air, but not in water, and the stem just above the root collar was found to be the best insulated and most resistant part of the plant. In most young conifers, the cortex is noticeably thicker at this point than at any other, in *Pinus longifolia* sometimes developing into a most conspicuous swelling as figured by Troup⁴ and seen in even more conspicuous form in seedlings grown in Louisiana. In connection with non-fatal injuries, Hiley⁵ reports that spruce hypocotyls showed increased permeability and constriction at 108°, but the cells recovered after exposure.

In Shirley's 24 tests of 4 species in dry air, red pine received most injury in 15 tests, and spruce in only 2; in moist air, spruce was injured the most; and in hot water it seemed slightly more susceptible than red pine, but in general the latter was the most easily injured. High relative susceptibility of red pine was also observed by the reviewer in a nursery in Maryland in which recently emerged red pine suffered heavily from basal stem lesions while loblolly pine in the same stage of development was not affected. Shirley found that spruce and white pine trees that lost their leaves from exposure to marginal temperatures often recovered by epicormic shoots; they differed less in susceptibility to tissue killing than in their ability to make recovery.

From comparative tests in dry air, the author concludes that light in the range of the visible spectrum does not influence heat tolerance.

Among the questions raised by this stimulating paper is that as to whether

the tissues would have been killed at these rather moderate temperatures if they had been gradually accustomed to heat before the exposure, as would normally occur in nature. One also wonders whether differences in soil moisture and temperature would have affected the heat tolerance of tops exposed to dry heat. Shirley indicates that heating tests would be desirable on trees rooted in dry soil, but points out that in such tests it would be difficult to distinguish the effects of heat and of drying. Further studies would also seem desirable on seedlings in active growth at the time of test, in order to determine the tolerance of the growing regions at the tips of shoots and the bases of needles.

Shirley's results serve to emphasize the fundamental differences between direct killing by heat, and injuries due to excessive drying in hot weather. They give support to the belief that when there is killing due to heat as such, many of the injured trees if examined promptly will show the injury to be localized in particular organs or tissues. In hot, dry, summer weather the infrequency of cases in which needles die and bark remains alive, may be taken to indicate that aside from basal stem lesions pure heat injury to the tops is not a common cause of loss in either nurseries or plantations. To avoid confusion, the reviewer believes that the damage in the field due to drying, at whatever temperature, should be termed drouth injury and not heat injury.

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⁴Troup, R. S. 1921. The silviculture of Indian trees. Vol. 3, Fig. 422.

⁵Hiley, W. E. 1924. Report Imperial Bot. Conf. London, p. 183.

The Identification of Trees & Shrubs.

By F(rederick) K(irkwood) Makins.
326 pp. *Illus.* E. P. Dutton & Co.,
Inc., N. Y. (J. M. Dent & Sons,
Ltd., London). 1936. Price \$4.

Among the ancient Hebrew people, as demonstrated in Holy Writ, six was the number of man, of incompleteness: 6 (the human number) + 1 (the divine number) represented perfection, completeness. Six interrogative, monosyllabic words, 3 adverbs, and 3 pronouns,—all beginning with the 23d followed by the 3th letter of the alphabet—represent the commonest questions of mankind, whereby slowly and painstakingly he gropes after the gleam of intellect through the tenebrous gloom of ignorance and mystery surrounding him on every side: What? When? Where? Which? Who? Why? Pundit or runic tome answering this sixfold riddle spells perfection, completion!

Mr. Makins is to be sincerely congratulated that his book gives the answers to a goodly host of our Whats and Wheres about woody plants. As the title page indicates, the work is an ingenious device to enable the inquisitive "to name without previous knowledge of botany any wild or garden tree or shrub likely to be met with in the British Isles, with 2,500 diagrams made by the author." The author is listed as possessing the "Diploma of Forestry of the University of Oxford; Formerly Exhibitioner in Natural Science at Trinity College, Cambridge, Deputy Conservator of Forests in the Government of India and Instructor in Botany in the Forest College, Dehra Dun." He is, therefore, peculiarly well qualified, as trained forester, botanist, teacher, and artist for his task.

The book consists of brief, explanatory prefatory remarks; a glossary of terminology employed; 128 pages, preceded by a brief key, in which 1,311 species of 534 genera are illustrated in

original, somewhat diagrammatic line drawings; 170 pages of brief descriptive matter, chiefly botanical; and an index. Conducive to brevity, an ingenious system of abbreviations is adopted. For example, "P₄" designates not, perchance, yellow phosphorus, but a tetramerous perianth; "G (5)" is a pistil (gynecium) with a superior ovary composed of 5 united carpels.

The book covers a very great number of woody plants native, naturalized or cultivated in the United States, is attractive in appearance, easy to use, and carefully and cleverly prepared; it should, therefore, prove popular and useful in this country. A handy adjunct is the accompanying bookmark, consisting of a list of the symbols and abbreviations used and an 8-inch rule along each side. The nomenclature seems to this reviewer to be of uneven merit. One is surprised and delighted at the recognition of cranberries (*Oxycoccus* spp.) as a genus distinct from *Vaccinium*, but is disappointed by seeing sassafras called "Ague tree;" the fourwing saltbush, or chamiza (*Atriplex canescens*), "Orach, or grey sage brush;" and *Chrysothamnus graveolens*, one of our commonest range rabbit-brushes, disguised under the effete generic name *Bigelovia* and the misleading and inappropriate vernacular "plumed golden rod."

W. A. DAYTON,
U. S. Forest Service.



Technologie des Holzes. By F. Kollmann. xviii + 764 pp. 604 figs.
Julius Springer, Berlin. 1936. Price
RM 69. (less 25 per cent in U.S.A.)

This is the most comprehensive book on wood technology, in its broadest sense, that has ever been written. It covers a wide variety of subjects from the sub-microscopic structure of wood as re-

vealed by X-ray diffraction patterns to the cutting action of saws and the use of wood in producer gas generators. Under the subject of wood structure, in addition to the usual discussion of annual rings, sapwood and heartwood, and cell structure given in works of this kind, the author describes the nature, origin, and objectionable features of 27 defects found in wood. The relation between specific gravity and rate of growth and site on the one hand and wood properties on the other hand is discussed.

One chapter is devoted to moisture content, moisture absorption including its hysteresis, fiber-saturation point, and the various methods of determining moisture content. Another chapter covers the phenomena of shrinking and swelling rather thoroughly, including the effect of liquids other than water. Under the movement of moisture in wood the theories of drying and impregnation are taken up mathematically. In fact, mathematical formulas and equations and two- and three-dimensional graphs are freely used in the book, not only in connection with such involved subjects as stresses in wood, but also in connection with swelling, sharpening of saws and knives, and the utilization of sawdust.

Thermal, electrical, and acoustical properties are given detailed attention. Tables of numerical values of friction of wood and other materials on themselves and on other substances form an unusual addition to a book of this kind.

Needless to say, a considerable portion of the book is devoted to the mechanical properties of wood, including resistance to torsion and abrasion, long-time loading, and fatigue under reversal of stresses.

Under the chemistry of wood the newer ideas on the molecular structure of cellulose, hemicellulose, and lignin are given. The destruction of wood by bacteria, fungi, insects, birds and marine borers, and methods of administering

preventive measures are treated at some length. The theory and practice of drying wood, both in the open air in kilns, and under vacuum, are discussed in detail.

A chapter on the theories of sawing, planing, boring, turning and polishing covers subject matter on which there is little in American literature. Other subjects included are the bending, gluing and nailing of wood, the use of bolts and metal connectors, manufacture of veneer, wood finishing (not painting), and injection of lubricants. A short chapter is devoted to the utilization of waste for fuel either directly or as producer gas. Wood conversion, utilization except for fuel, papermaking, and wood measurement, are not included in the text. The book touches directly on forest management in the discussion of the time of felling on the properties and uses of wood.

Material is drawn widely from publications originating in different countries and numerous references and citations are given. A translation in English would be a valuable addition to American literature on the subject.

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Products Laboratory.



II:n Valtakunnan Metsien Arvioinnin Suunnitelma Ja Ulkotyöohjeet.

[Instructions for Field Work of the IInd National Survey of the Forests of Suomi (Finland).] By Yrjö Ilvessalo. 54 pp. in Finnish, 23 pp. English summary. 8 illus. sample forms, and map. Helsinki, 1936.

The first nation-wide survey of the forests of Finland was made under Dr. Ilvessalo's supervision soon after Finland had gained its independence. The Finnish survey was completed in 1924, and

the surveys in Sweden and Norway were completed in 1929 and 1930, respectively. Finland is now undertaking a second survey at an estimated cost of \$67,000, including an intensive survey of portions of the country requested by the wood-working industries. Since the previous survey almost one-half of the growing stock then present has been cut. The second survey is to determine the present status of the forest resources, both in quantity and in quality.

In explaining the need for this resurvey, Dr. Ilvessalo states: "But however great the value of the results of such a national forest survey may be, it is to a great extent momentary. The country's forests grow, they are cut, they become older and new ones take their place; the most varied changes occur in the forest resources both from natural and human causes. The picture of the forest resources and of the condition of the forests of a country that is obtained on the basis of a national forest survey and that may be excellent and reliable in every respect, is in course of time out of date. In the rapidly developing conditions of the present day the applicability of the results of the survey becomes rather doubtful in the course of a dozen years, so that uncertain calculations are used and attempts are made to convert the results to suit the present day. But owing to the con-

stant advance of time the uncertainty gradually becomes too great."

It is estimated that 15,000 to 20,000 sample plots will be taken on slightly over 20,000 km. (12,400 miles) of line. "The Forest Research Institute that has, as before, been entrusted with carrying out the survey has developed the methods to be employed on the grounds of its investigations and has drawn up a scheme in a manner conforming to the present-day requirements of forestry. The main principle, however, is the same as for the first survey of the Finnish forests: a line survey and detailed sample plots at fixed distances." The data will be transposed to punch cards for sorting and tabulating by machines of the Hollerith and Powers systems.

Detailed instructions are given regarding the maps to be used, how the lines are to be run, how measurements are to be made, the classification of lands, description of the forest stands, and other pertinent items. With our own forest survey still under way, this description of the Finnish methods should be of interest to foresters and forest economists in this country. It might be well also to consider the question of how long our survey data can be relied on before a re-survey will be necessary.

G. H. LENTZ,
U. S. Forest Service.



CORRESPONDENCE



RESOLUTIONS ADOPTED BY THE FORESTRY
SECTION, NORTHWEST SCIENTIFIC ASSO-
CIATION, SPOKANE, WASHINGTON
DECEMBER 30, 1936

1

WHEREAS, few sciences, either fundamental or applied, demand of their practitioners so wide an acquaintance with the various fields of human endeavor; and

Whereas, it is the feeling of employers of young professional foresters that the vocational aspect of their work be obtained during a training period immediately after gaining employment rather than in the classroom;

Therefore, Be It Resolved, that the forestry section of the Northwest Scientific Association strongly recommends that the western forest schools give the broadest fundamental training, both in physical sciences and the humanities, that is compatible with the facilities and time available in their respective schools.

2

Whereas, with the increase of knowledge and the resulting specialization in the broad field of forestry, it is becoming increasingly evident that a broader fundamental training is needed in the undergraduate preparation of prospective foresters; and

Whereas, the Society of American Foresters has recently suggested the setting up of minimum course requirements, as one qualification for membership in the Junior grade that may seriously restrict the forest schools in giving prospective foresters the fundamental training needed for the broad field of forestry;

Therefore, Be It Resolved, that the forestry section of the Northwest Scientific Association strongly urges the Council of the Society of American Foresters to give careful thought before adopting any membership requirement for the Junior grade that may hamper or restrict the forest schools in their attempt to prepare men for the profession of forestry.

3

Whereas, federal organizations selecting for employment young professional foresters and range management men from the Civil Service eligible lists have for a number of years criticized the inadequacy of training of such men;

Whereas, these young men to place their names on the eligible list must pass an examination, the questions for which are made up by the same organizations who have been most severe in their criticism;

Therefore, Be It Resolved, that a committee from the federal organizations and a committee from the forest schools do their best to bring about harmony in the needs of the federal organizations and the methods used to fulfill these needs, the two committees to unite their efforts in attempting to convince the Civil Service Commission of the merit of their suggested plan.

Dear Professor Chapman:

I have your letter of February 19 regarding the three resolutions passed by the Forestry Section of the Northwest Scientific Association on December 30, 1936.

The members of the Resolutions Committee are Prof. J. H. Ramskill, Univer-

sity of Montana, Chairman, Prof. E. R. Martell, University of Idaho, and Prof. E. H. Steffen, Washington State College.

In further correspondence would you address J. P. Nagel of the Washington State College, Pullman, who is the 1937 Secretary of the Forestry Section.

KENNETH P. DAVIS,
Sec.-Treas., Forestry Section.

Dear Dean Mulford:

I am in receipt of copy of three resolutions adopted by the Forestry Section of the Northwest Scientific Association, on December 30, 1936. I notice that you were on the program for a talk on education in forestry and should be very glad to receive a copy of your remarks.

It is not true that the Society of American Foresters has suggested setting up minimum course requirements. Recently the President of the Society has done so. But the Constitution of the Society gives the Council power to pass upon curricula as to adequacy in preparation of men for the profession of forestry.

The minimum course requirements, therefore, to which these resolutions object can only refer to those that I personally put out tentatively to serve as a basis of discussion. This looks to me to be an effort to undermine the purpose of the Society in endeavoring to secure any minimum whatever, which would in any way restrict a school in adopting anything it pleased and calling it a forestry course.

The protest is clearly against any minimum requirement whatever and could, therefore, hardly apply to the very low minimum suggested in my article. The protest is based upon the idea that foresters need a broad fundamental training outside of forestry, i.e., evidently in science, economics, history, and other broadening and cultural subjects. This idea in itself is fundamentally excellent but not in any profession will one find these fundamental subjects substituted for basic general professional training, and the

minimum required in these professional courses reduced practically to zero because of the overwhelming importance of the laying of the foundation of such a course.

Is forestry as a profession to be ground between the upper and nether millstones and dispossessed of its professional entity by foundation subjects and specialized courses? The effort to secure needed recognition for the body of instruction which can be labeled professional forestry as distinct from foundation cultural preparation on the one hand and specialization in game management, utilization, recreation, and other features, on the other hand, appears to me to be more than ever worthwhile for the very reason of the pressure from both these directions to wear away the solid foundation of training in what we assume and hope is a definite profession.

I am beginning to be a little irritated at what appears to me to be the blindness of certain educators and others in forestry who plainly attach no importance whatever to the securing of adequate basic professional training in forestry itself. They are possessed, on the one hand, with the idea that a forester must be culturally educated or else he cannot function and on the other that he must be given a top-notch, complete finish in some definite specialized group, regardless of whether he knows anything about the broad professional basis of his work. Of course there is only one answer and it is in the effort to avoid facing this situation that these millstones are started grinding against each other and the resolutions which oppose the minimum curricula were passed by the Northwest Scientific Association.

The answer is a five-year course. If this insistent pressure for more culture and more specialization is going to obscure our foundation, through the effort to get one or both of these considerations crowded into the four year course it must

inevitably be so weakening that our professional status must suffer severe impairment; for professional grounding in forestry takes a minimum of two years by any sort of figuring.

I cannot see how forestry differs from any other curriculum giving education which presumes to prepare a man for a recognized profession. I have yet to learn that medicine or law has permitted the substitution of cultural subjects or premature specialization in any line of these professions for a solid foundation of general instruction which their institutions now demand. Foresters have got to do some clear and sensible thinking on this subject, for they are confused and are thinking in circles. This, to my mind, is self-evident by the action of the Division of Education at Portland which voted down any minimum for courses in forestry, and the passage of the above mentioned resolutions by the Northwest Scientific Association.

H. H. CHAPMAN,
President.

Dear Professor Chapman:

I thoroughly enjoy a clean, hard fight, and welcome the Preliminary Report by the Chairman of the Committee on Schools of Forestry as being a challenge to the members of the Society to engage in one, a fight to make the standards of the profession what we desire them to be.

The Society, through its power to regulate the qualifications of those whom it admits to membership, is the one organization that enjoys the privilege of controlling the status of the profession of forestry in America. By wise, thoughtful and judicious use of this power it can hasten the advance and expansion of the profession and guide it to an increased prestige. On the other hand, as a result of this power it is faced with the responsibility of doing just that, and I say this without qualification, or of permitting the profession to slough to a level from

whence it will be unable to contribute its fullest measure of service toward the human welfare. With one accord the members of the Society must acknowledge that the profession is the sole excuse for the Society's existence, and its actions must be governed accordingly.

A membership strong merely in numbers, while it may be of immediate aid to the Society financially, will be of no benefit to the profession and may even tend to cause its stagnation. By accepting to Junior membership graduates of approval schools of forestry, regardless of whether or not they pursued a course of study in professional forestry, we are admitting our weakness as a society and are contributing voluntarily toward the degeneration of the profession. Pursuance of a highly specialized curricula in wood utilization or any of its various ramifications are not of necessity professional foresters. They do not have the same understanding of forestry or the same viewpoint toward it as do men trained purposely for the profession, and what is of even more importance, in all too many circumstances they do not regard it in the same public spirited attitude.

Forestry is a young profession and one which is as yet too little understood by the average layman. It has enjoyed, however, a steadily increasing prestige. This is due in part to the efforts of the men in the entire field of forestry, and in the Society, but in a larger share to the presidential regimes of Theodore Roosevelt and Franklin D. Roosevelt and to the attitude of public service which has emanated from the U. S. Forest Service. Our presidents, however, do not always possess a Rooseveltian concept of forestry, and as time progresses the Forest Service will undoubtedly cease to maintain its present large percentage of the total number of men engaged in the profession.

In view of this the responsibility that falls on the Society will be an ever increasing one. To maintain satisfactory

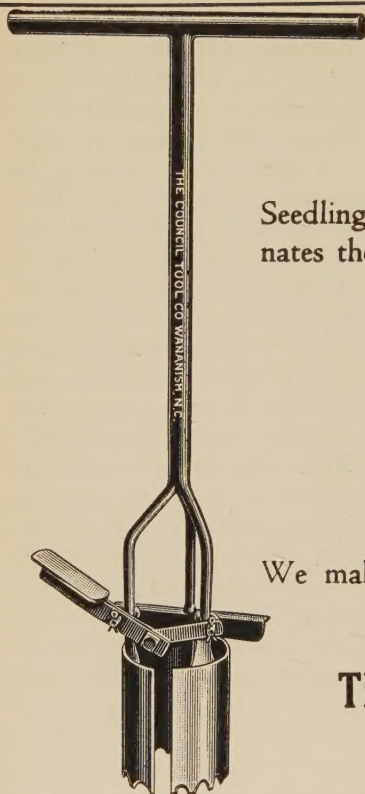
professional standards and a public-spirited attitude throughout the entire field of forestry it will be obligatory that the Society itself possess, as the guiding hand of the profession, an even richer endowment of those same qualities which it seeks to instill in the profession. This can be assured in only one way, by accepting to Junior membership graduates of the professional course alone, men who by the very nature of their training and occupation will be keenly interested in holding themselves responsible for the continued expansion and advancement of forestry as a profession of public service.

Furthermore, inasmuch as forestry is a young profession, one of our jobs is to place it continually before the public in the form in which we wish it to be regarded. Forestry will only gain a prestige and legal status similar to law and medicine when public opinion has been

sufficiently instilled with the conviction that foresters possess a training similar in professional standards and parallel in basic uniformity to the training received by lawyers and doctors. By admitting to Junior membership persons other than professionally trained foresters we are defeating our own ends in this matter. We are not living up to our duty to the profession and the men within it when we accept as Junior members men who, by reason of their training, occupations, and interests may delay or even prevent the progress of forestry towards becoming a profession with a legal status.

Only by admitting to Junior membership professional foresters, and professional foresters alone, can we truthfully say that we are fulfilling our obligations to the profession of forestry.

WILLIAM S. MEACHEM,
Florida National Forests.



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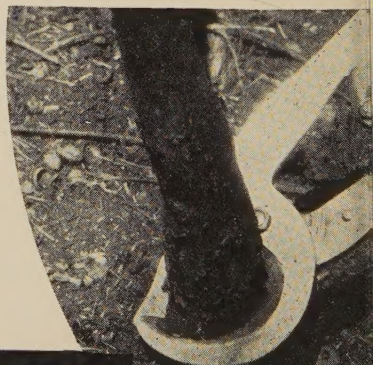
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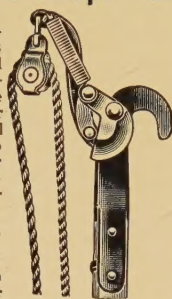
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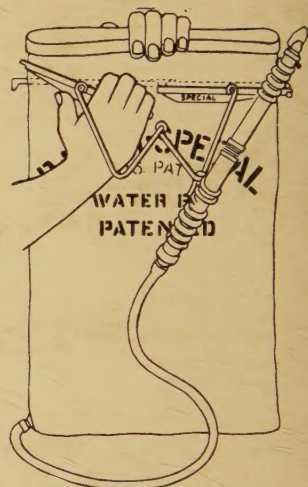
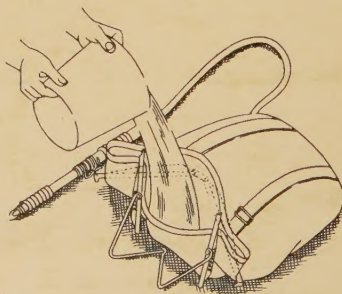
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